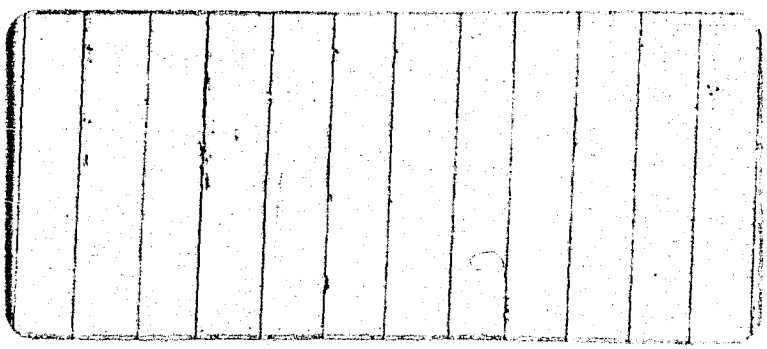
jpl

954582



JET PROPULSION LABORATORY
CALIFORNIA INSTITUTE OF TECHNOLOGY
PASADENA, CALIFORNIA

THE PERKIN-ELMER CORPORATION
APPLIED OPTICS DIVISION
2930 Bristol Street, Costa Mesa, California 92626

FINAL REPORT
SYNTHETIC APERTURE
RADAR CORRELATOR
PHASE HISTORIES

December 1977

Perkin-Elmer Report Number 6590

Prepared For
Jet Propulsion Laboratories
Pasadena, California

PERKIN-ELMER

This report is submitted in compliance with JPL Contract No. 954582.

It supplements the design of the following subsystems:

1. Zoom azimuth telescope, zooming range from 3X to 6X.
2. Range curvature correcting lenses.
3. Sphero-cylindrical shift lens.
4. Auxiliary lenses (tilted cylinder and matching lens)

These subsystems were designed to work with the Base Plant Correlator.

Two phase histories are analyzed in this report, which are labeled PHASE G and PHASE I. The parameters of these are:

	PHASE G	PHASE I
A	4.3	4.3
K_1	4.0696×10^5	4.0696×10^5
K_2	0.39062	0.39062
K_3	-4.5573×10^3	-4.5573×10^3
K_4	1.5748	1.5748
K_5	0	1645.0
r_o	109.6	109.6
x_{min}	-1.65	-1.65
x_{mx}	1.65	1.65
y	0.665	0.665
r_c	110.6	110.6

TABLE OF CONTENTS

PART I

SPECIFICATION OF THE CORRELATOR AND SUBSYSTEMS

Notes on the Computer Printout

(1) The first column gives the surface number and type:

SPH denotes a spherical surface
CYL denotes a cylindrical surface

For these the next column indicates the radius which is printed at the center of the column in the case of a spherical surface. The radius of a cylindrical surface with horizontal axis is printed displaced to the left, and when the axis is vertical the radius is printed displaced to the right.

(2) Some of these "surfaces" are not actual optical surfaces as

RPH denoting radar phase history

The parameters of the phase history are found after the list of surfaces under the title "TABLE OF CONSTANTS". These parameters are printed in the following order

K_1 K_2 K_3 R_c $2\pi K_5/K_4$

(3) Other "surfaces" actually denote rotation and translation in the coordinate axis, in particular

RTN denotes rotation

with the value of the angle given in radians, printed to the left for rotation about a horizontal axis and printed to the right for a rotation about a vertical axis.

(4) The third column indicates the axial separation between consecutive surfaces. The last column gives the relative position of each surface with respect to the image surface or output plane.

(5) Columns 4,5,6 specify refractive indices for the optical glasses used in the lens elements. The glass code appears in column 7 and the glass name in column 8.

(6) Columns 9 and 10 indicate the half-clear aperture of each surface.

ESIGN NO.643256, JPL CORRELATOR, RANGE CURVATURE CORRECTOR, SHIFT AND AUXILIARY LENSES 103177- 0

2 -2 1 .332500=PM(1) 0.000000=SIN UM(1) 1.000000=HP(1) 0.000000=TAN UP(1)
2 -2 1 1.650000=PM(2) 0.000000=SIN UM(2) .090047=HP(2) 0.000000=TAN UP(2)

		RADIUS,ETC	AXL.DSTNCE	.63280 M-INDEX	.48610 L-INDEX	.65630 U-INDEX	GLASS CODE,NAME	25.4MM=UNIT OF LENGTH 1ST.CA	2ND.CA	STATION
			0.0000	1.00000	1.00000	1.00000		0.00	0.00	132.0518
1	RPH	********* .0000	18.0000	1.00000	1.00000	1.00000	0.000	0.00	0.00	132.0518
2	SPH	-10.4469	1.8839	1.74969	1.77469	1.74729	755.276 SF4	2.15	0.00	114.0518
3	SPH	-13.4336	.0307	1.00000	1.00000	1.00000	0.000	2.33	0.00	112.1679
4	SPH	31.1330	1.3652	1.74969	1.77469	1.74729	755.276 SF4	2.34	0.00	112.1372
5	SPH	-24.5830	5.5793	1.00000	1.00000	1.00000	0.000	2.32	0.00	110.7720
6	SPH	-14.9126	1.3477	1.50671	1.51423	1.50592	508.612 ZKN7	1.76	0.00	105.1927
7	SPH	15.8548	3.6306	1.00000	1.00000	1.00000	0.000	1.72	0.00	103.8450
8	SPH	24.5464	1.3652	1.74969	1.77469	1.74729	755.276 SF4	1.78	0.00	100.2144
9	SPH	-34.5304	3.5303	1.00000	1.00000	1.00000	0.000	1.75	0.00	98.8492
10	SPH	13.1420	1.8553	1.74969	1.77469	1.74729	755.276 SF4	1.48	0.00	95.3189
11	SPH	10.5330	16.0000	1.00000	1.00000	1.00000	0.000	1.31	0.00	93.4636
12	RTN	-.0587	-.1653	1.00000	1.00000	1.00000	0.000	0.00	0.00	77.4636
13	SPH	-6.6582	.3305	1.79883	1.82776	1.79609	805.254 SF6	.45	.16	77.6288
14	CYL	-6.6582	-.1653	1.00000	1.00000	1.00000	0.000	.46	.18	77.2983
15	RTN	.0587	1.2919	1.00000	1.00000	1.00000	0.000	0.00	0.00	77.4636
16	RTN	.0587	-.1630	1.00000	1.00000	1.00000	0.000	0.00	0.00	76.1717
17	CYL	-7.3958	.3260	1.79883	1.82776	1.79609	805.254 SF6	.42	.25	76.3347
18	SPH	-7.7230	-.1630	1.00000	1.00000	1.00000	0.000	.41	.26	76.0087
19	RTN	-.0587	1.2522	1.00000	1.00000	1.00000	0.000	0.00	0.00	76.1717
20	CYL	5.6253	.2500	1.79883	1.82776	1.79609	805.254 SF6	.50	0.00	74.9195
21	SPH	30.3365	17.9790	1.00000	1.00000	1.00000	0.000	.50	0.00	74.6695
22	SPH	-10.5330	1.8553	1.74969	1.77469	1.74729	755.276 SF4	1.15	0.00	56.6905
23	SPH	-13.1420	3.5303	1.00000	1.00000	1.00000	0.000	1.27	0.00	54.8352
24	SPH	34.5304	1.3652	1.74969	1.77469	1.74729	755.276 SF4	1.40	0.00	51.3049

25	SPH	-24.5464	3.6303	1.00000	1.0[illegible]	1.00000	0.000		1.45	0.00[illegible]	49.9397
26	SPH	-15.8548	1.3477	1.50671	1.51423	1.50592	508.612	ZKN7	1.34	0.00	46.3094
27	SPH	14.9126	5.5793	1.00000	1.00000	1.00000	0.000		1.35	0.00	44.9617
28	SPH	24.5830	1.3652	1.74969	1.77469	1.74729	755.276	SF4	1.68	0.00	39.3824
29	SPH	-31.1330	.0307	1.00000	1.00000	1.00000	0.000		1.69	0.00	38.0172
30	SPH	13.4336	1.8839	1.74969	1.77469	1.74729	755.276	SF4	1.68	0.00	37.9865
31	SPH	10.4469	13.8798	1.00000	1.00000	1.00000	0.000		1.54	0.00	36.1026
32	CYL	3.6547	.6500	1.63269	1.64909	1.63108	636.353	F6	1.23	.50	22.2228
33	CYL	-6.4870	.2149	1.00000	1.00000	1.00000	0.000		1.22	.47	21.5728
34	CYL	-5.2748	.3500	1.79883	1.82776	1.79609	805.254	SF6	1.22	.43	21.3579
35	CYL	INFINITE	9.5469	1.00000	1.00000	1.00000	0.000		1.22	.42	21.0079
36	CYL	INFINITE	.3500	1.79883	1.82776	1.79609	805.254	SF6	1.10	.32	11.4610
37	CYL	2.2357	.6000	1.63269	1.64909	1.63108	636.353	F6	1.93	.33	11.1110
38	CYL	-2.1304	.2026	1.00000	1.00000	1.00000	0.000		1.09	.37	10.5110
39	CYL	2.5833	.6000	1.63269	1.64909	1.63108	636.353	F6	1.09	.36	10.3084
40	CYL	-3.2796	.3500	1.79883	1.82776	1.79609	805.254	SF6	1.08	.33	9.7084
41	CYL	INFINITE	2.3284	1.00000	1.00000	1.00000	0.000		1.08	.31	9.3584
42	CYL	-1.7898	.3500	1.79883	1.82776	1.79609	805.254	SF6	1.05	.13	7.0300
43	CYL	-5.6466	.0200	1.00000	1.00000	1.00000	0.000		1.05	.12	6.6800
44	CYL	INFINITE	.3500	1.79883	1.82776	1.79609	805.254	SF6	1.05	.12	6.6600
45	CYL	2.4613	.0200	1.00000	1.00000	1.00000	0.000		1.04	.11	6.3100
46	CYL	.9311	.3500	1.79883	1.82776	1.79609	805.254	SF6	1.04	.11	6.2900
47	CYL	1.2905	3.3600	1.00000	1.00000	1.00000	0.000		1.04	.09	5.9400
48	RTN	.0761	0.0000	1.00000	1.00000	1.00000	0.000		0.00	0.00	2.5800
49	CYL	INFINITE	.4000	1.79883	1.82776	1.79609	805.254	SF6	1.00	.06	2.5800
50	CYL	-1.2000	0.0000	1.00000	1.00000	1.00000	0.000		1.01	.07	2.1800
51	RTN	-.0761	.5000	1.00000	1.00000	1.00000	0.000		0.00	0.00	2.1800
52	CYL	1.2000	.4000	1.79883	1.82776	1.79609	805.254	SF6	1.01	.07	1.6800
53	CYL	INFINITE	1.2800	1.00000	1.00000	1.00000	0.000		1.00	.06	1.2800
54	SPH	INFINITE	-.0305	1.00000	1.00000	1.00000	0.000		0.00	0.00	-.0000

ORIGINAL PAGE IS
OF POOR QUALITY

TABLE OF CONSTANTS

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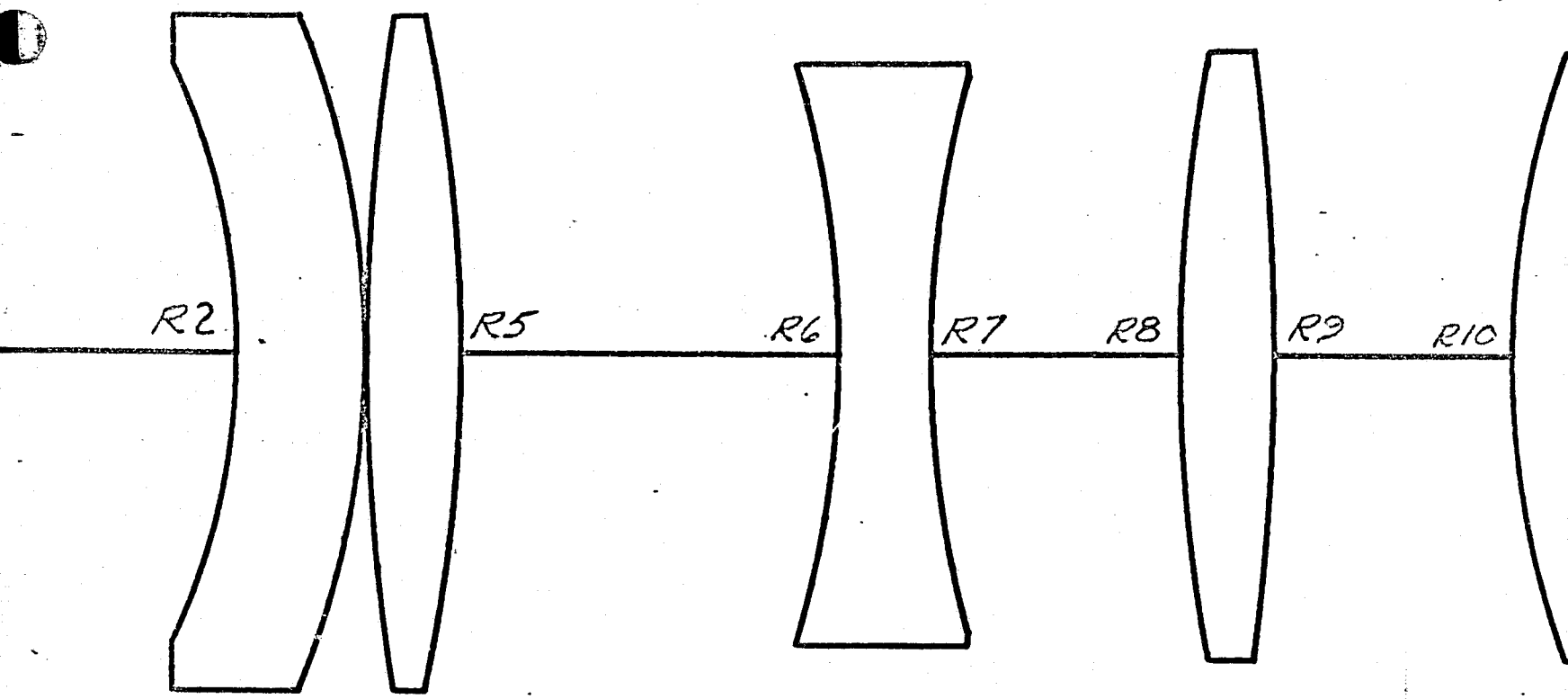

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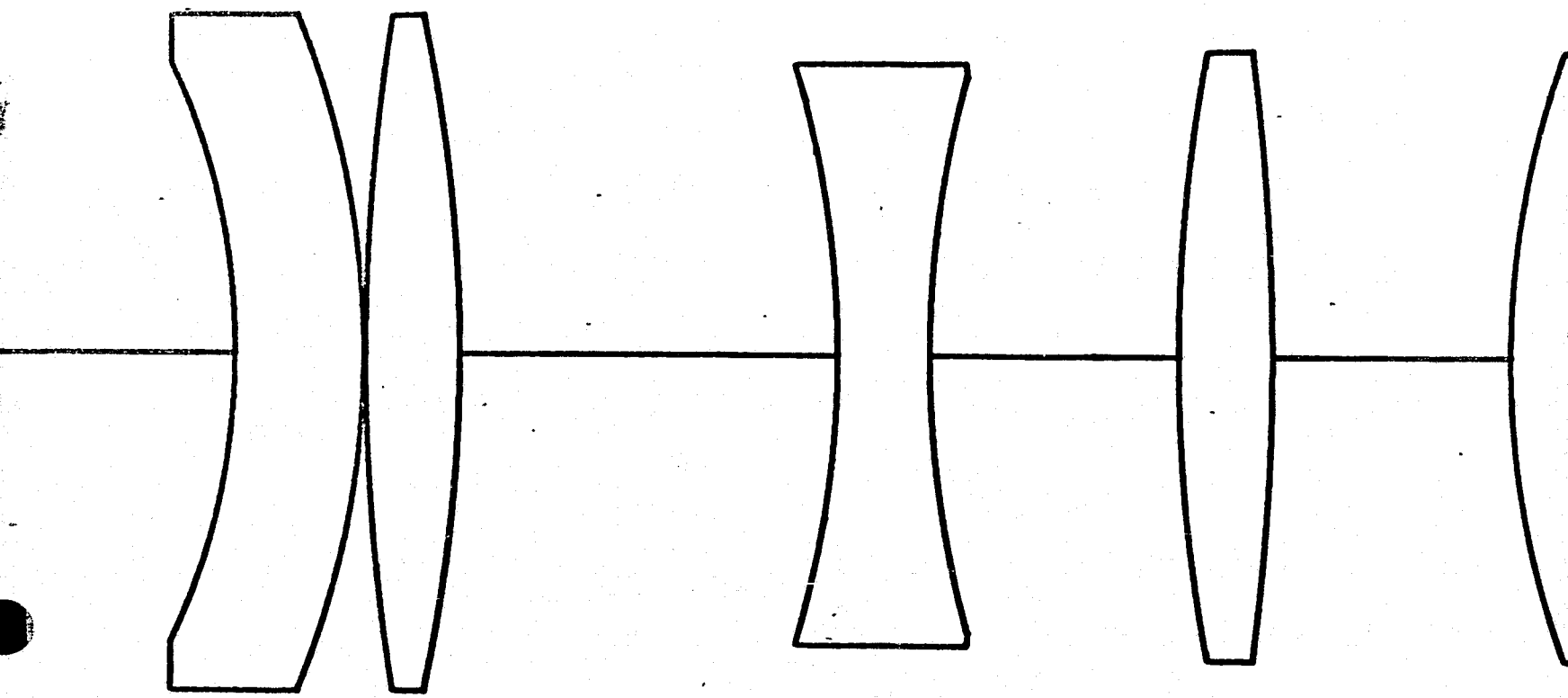

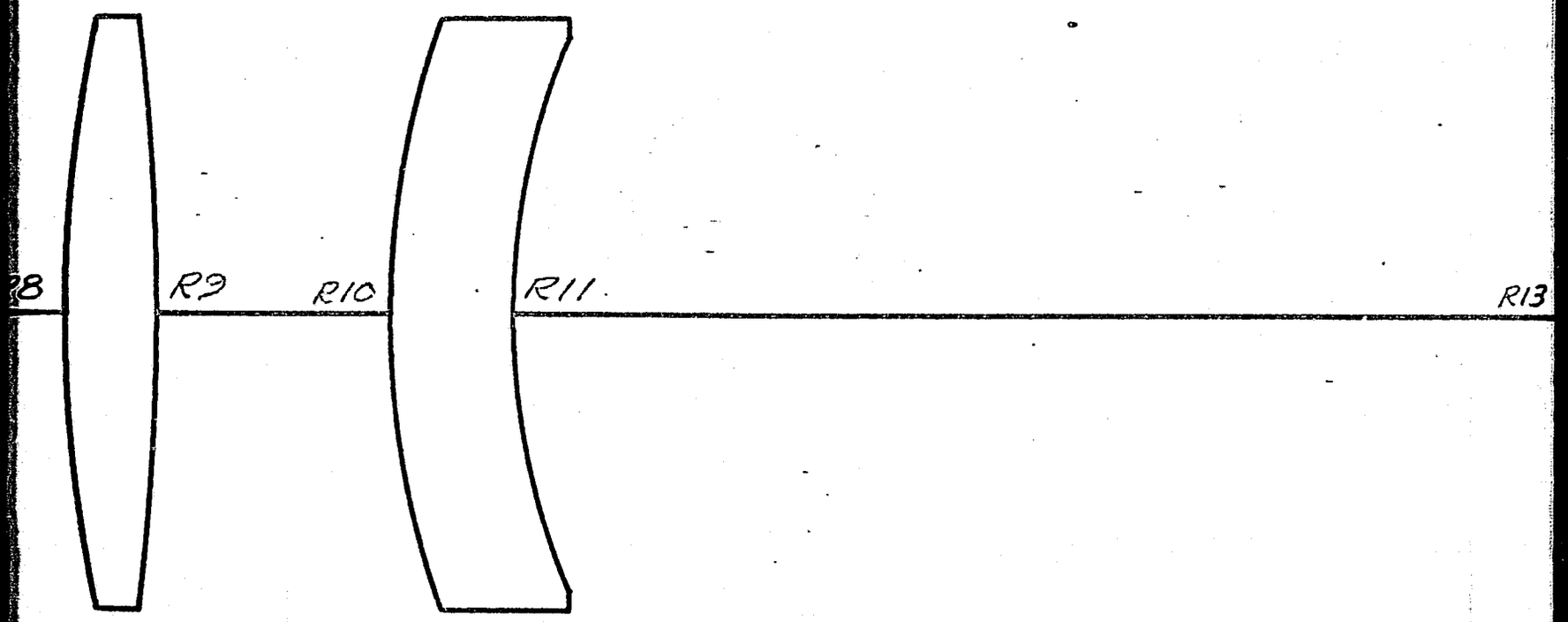

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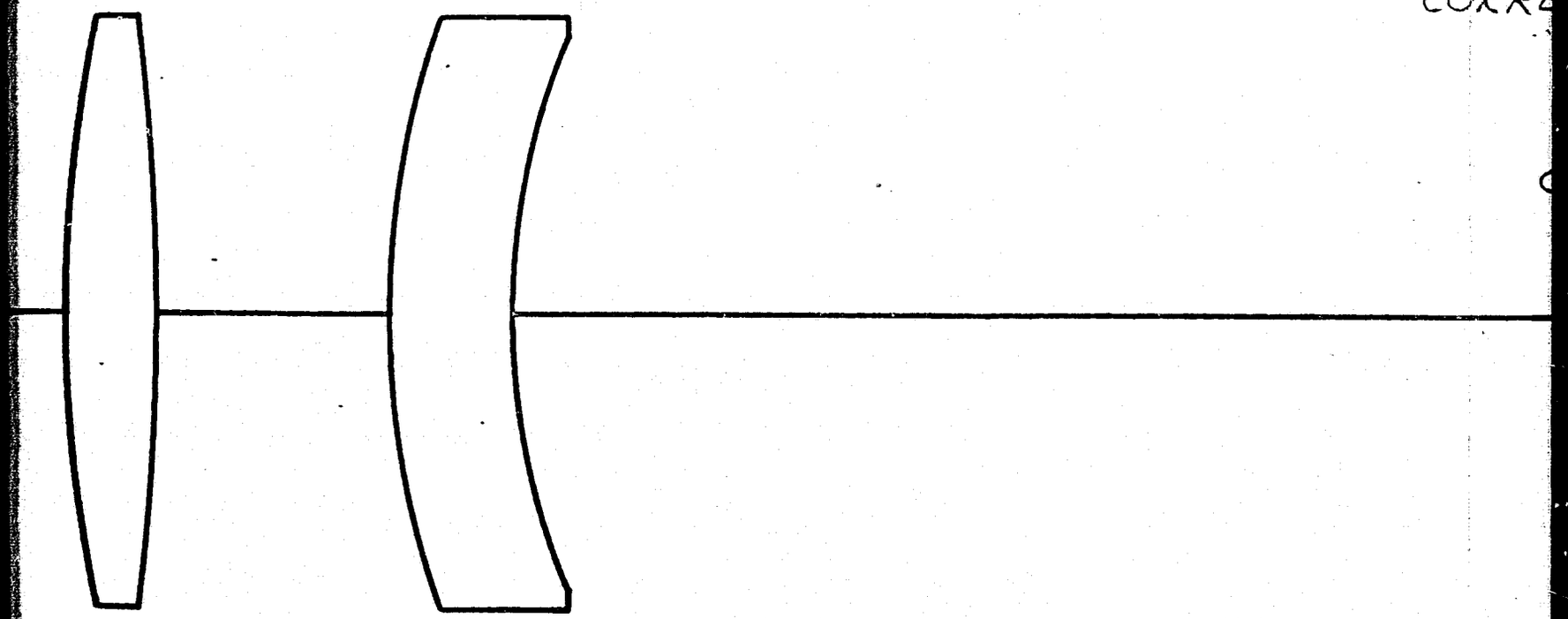

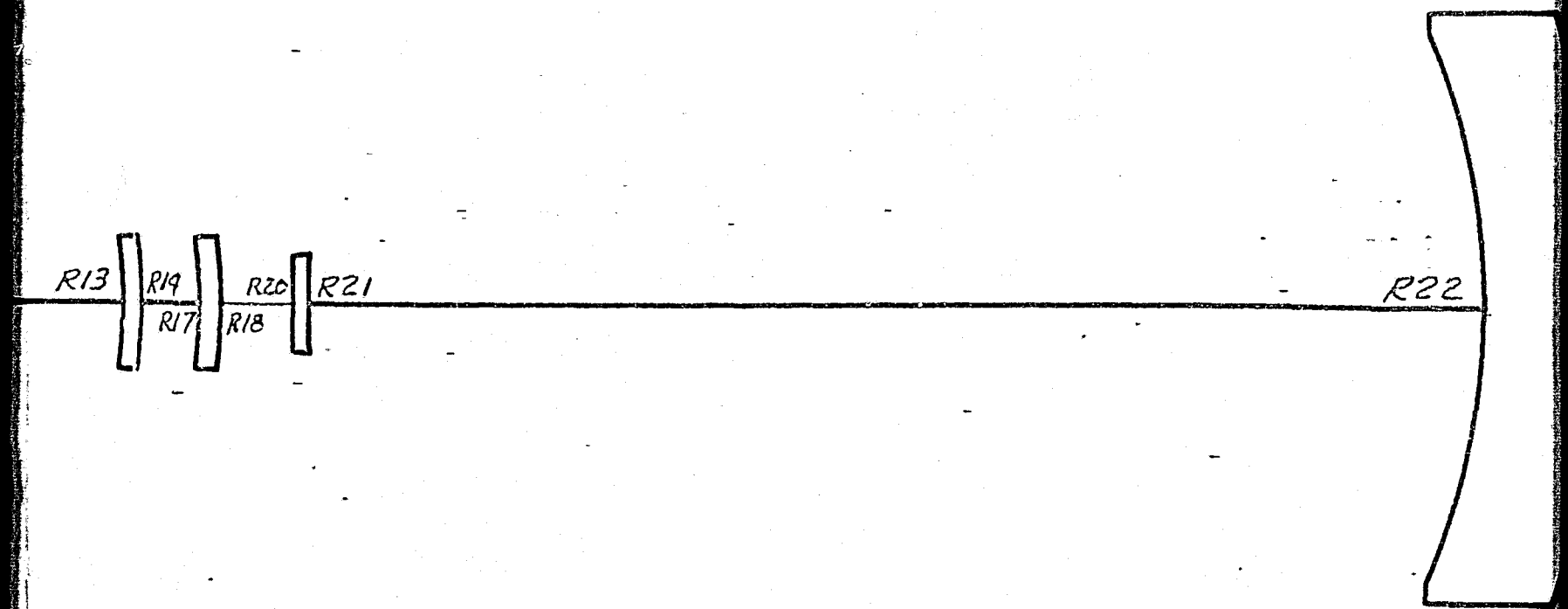

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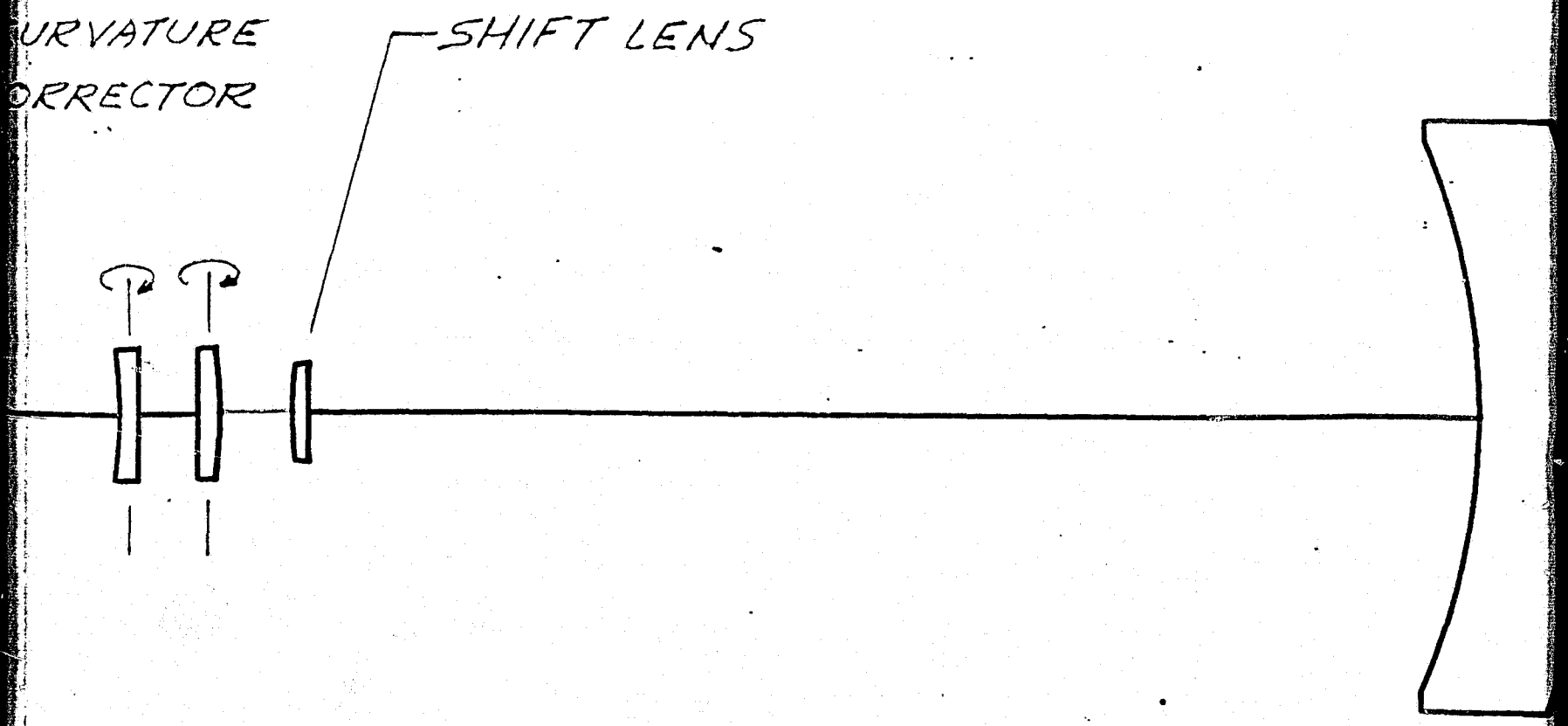

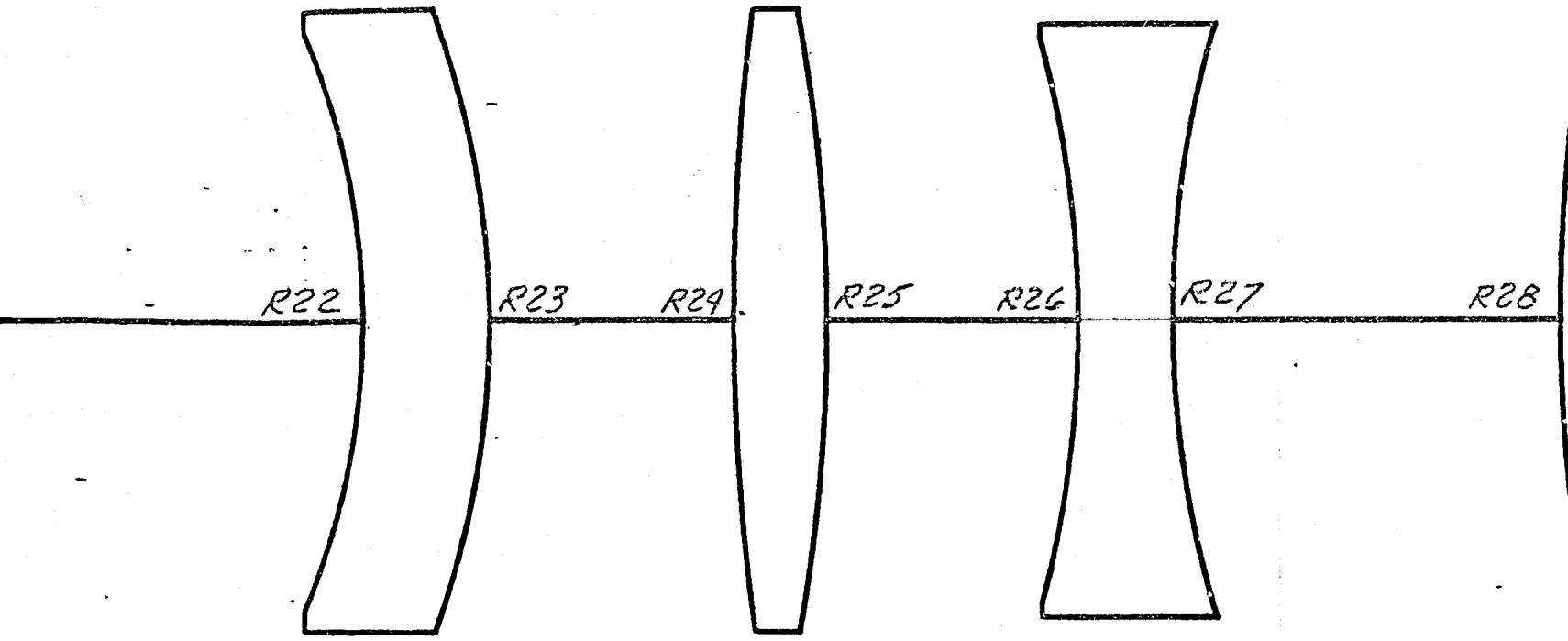

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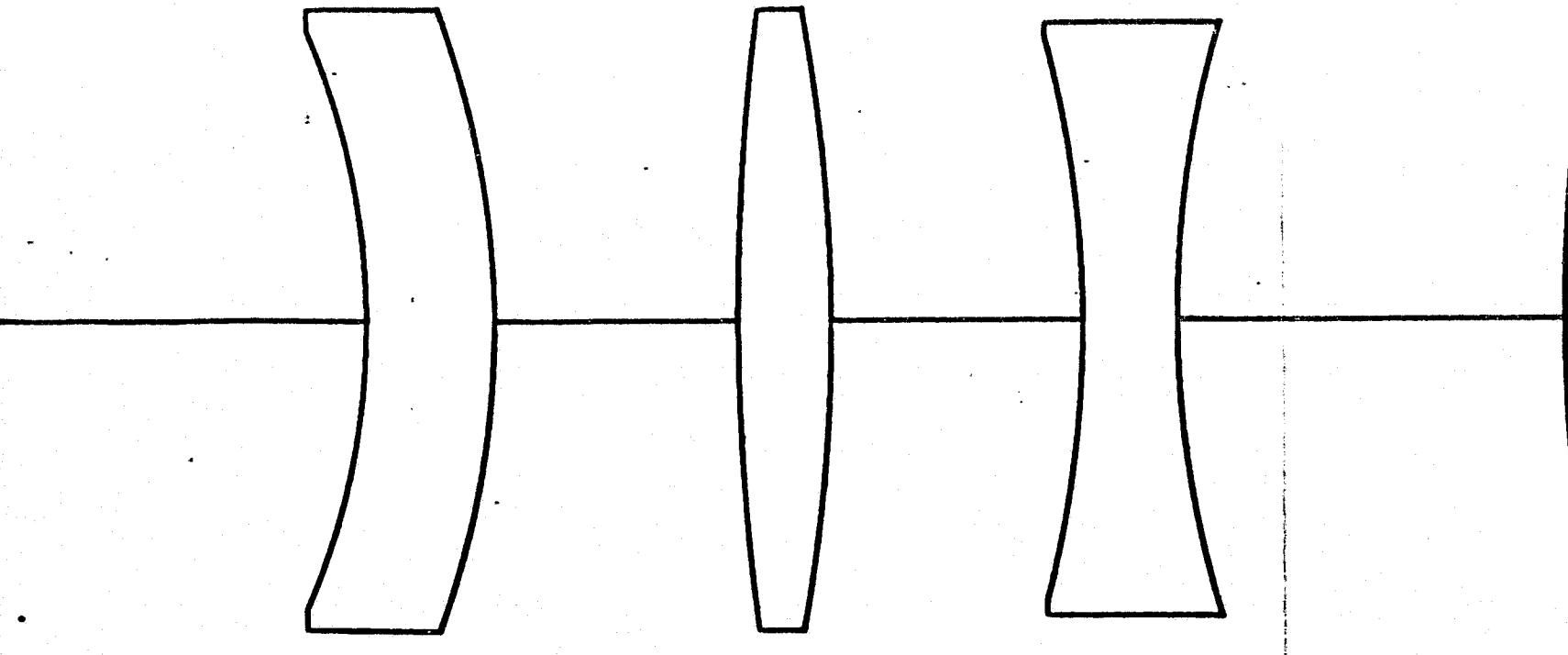

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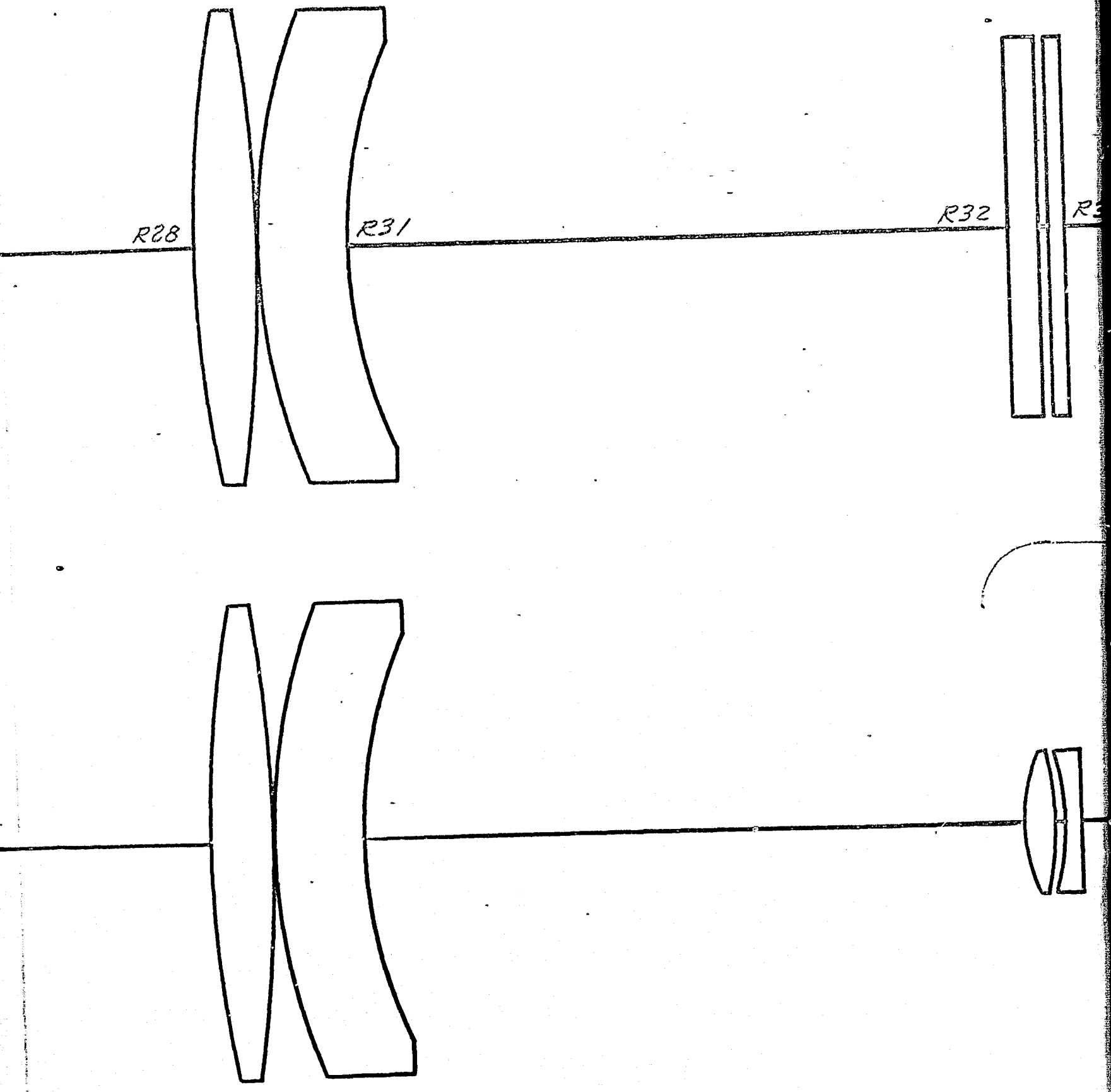

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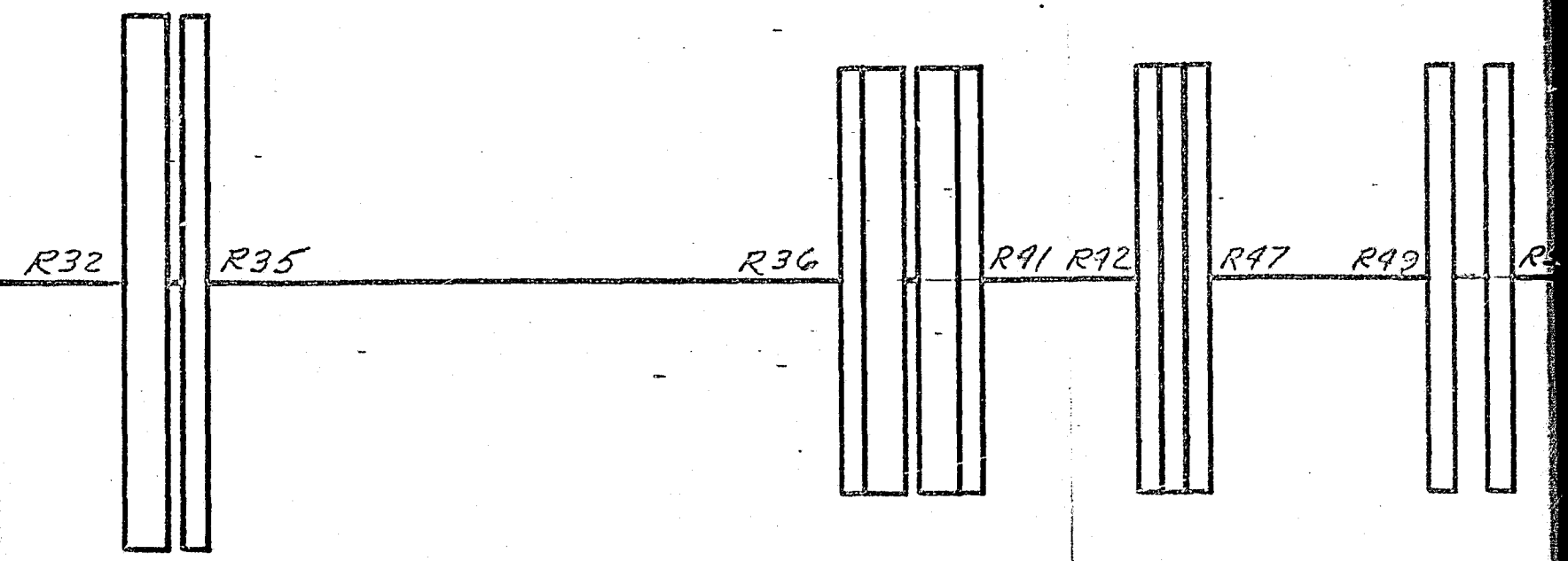
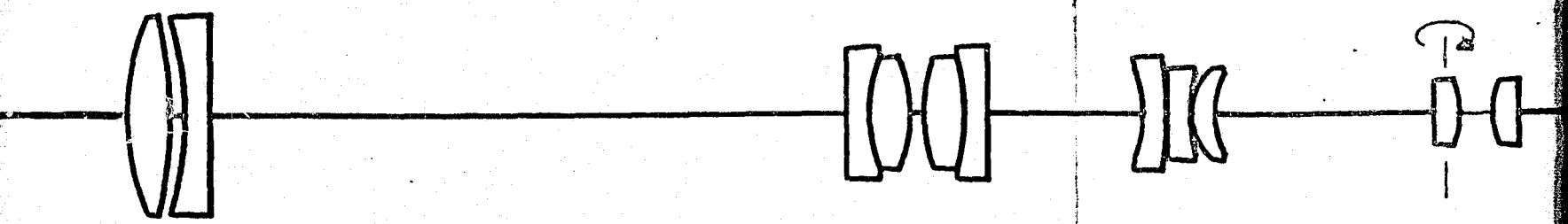


AZIMUTH TELESCOPE

AUXILIA
LENSES



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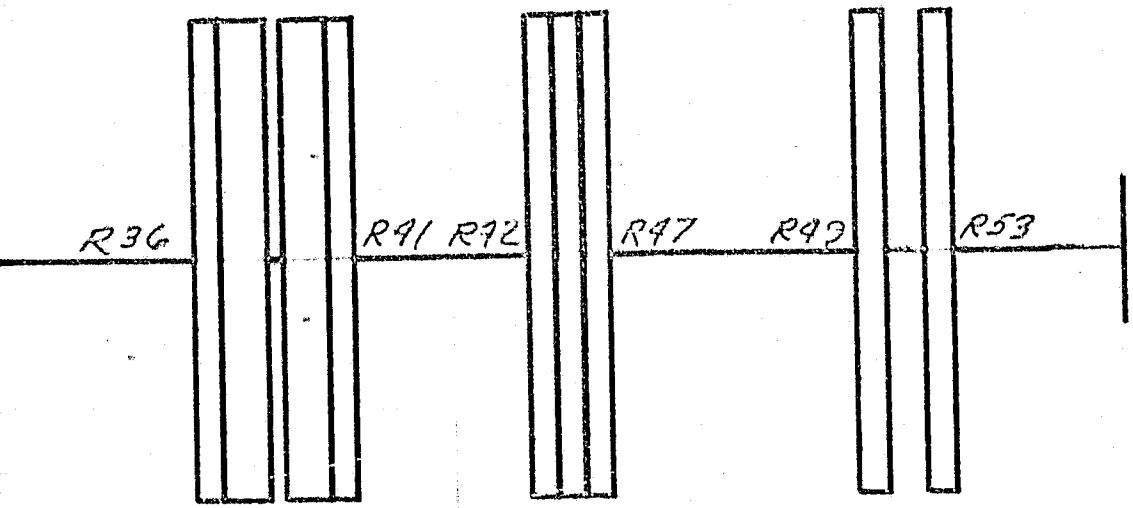
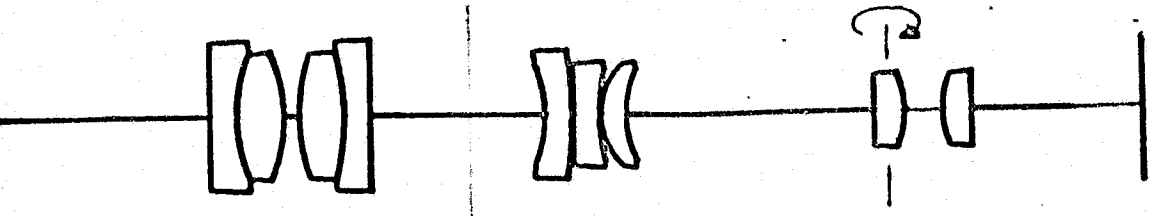


MERIDIONAL PROJECTION

TELESCOPE

AUXILIARY LENSES



EQUATORIAL PROJECTION

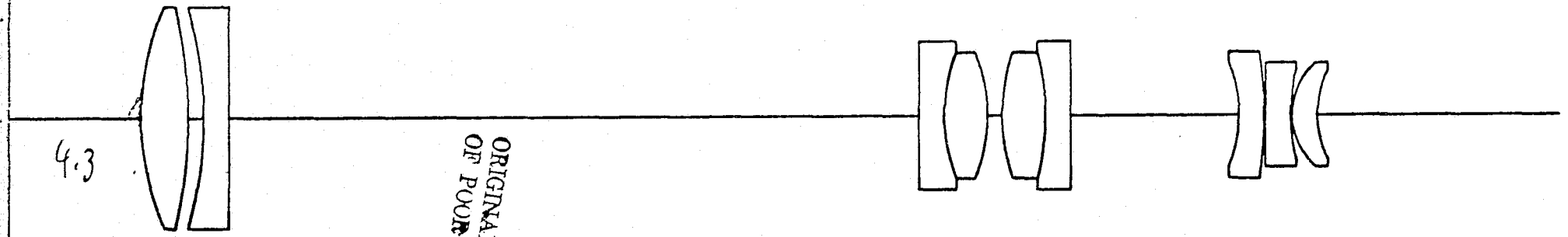
OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
-27.670022	999999.999996	999999.999996	999999.999996	372040.205900	182809.719947	1.210148
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
1.000000	999999.999996	41.609055	-20.445409	-40.196955	4547.819820	-.966063
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
-.966063	0.000000	131.981909	130.771761	-158.441783	.000303	-1.035130
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
0.000000	1.248489	19.000000	159.651930	1.932125	1.210148	53.000000

FIRST ORDER PARAMETERS ON EQUATORIAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
175.467238	999999.999996	198.391415	4.166255	-3.781136	.385119	1.310471
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
.090047	999999.999996	-53.171890	9.663494	11.809819	.078354	-.020000
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
-.222106	0.000000	132.082232	130.771761	44.695477	-1.238164	-4.502346
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
0.000000	6.479563	35.000000	-43.385006	0.000000	2.109813	47.000000

DESIGN NO.64325A. AZIMUTH TELESCOPE 4.3X MAGNIFICATION 103177- 0

2	-2	1	.210416=PM(1)	-.012500=SIN UM(1)	2.250000=HP(1)	0.000000=TAN UP(1)
2	-2	1	.498972=PM(2)	-.009854=SIN UM(2)	.085999=HP(2)	0.000000=TAN UP(2)
				.63280 .48610 .65630		25.4MM=UNIT OF LENGTH



FIRST ORDER PARAMETERS ON MERIDIONAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
16.833283	999999.999996	0.000000	999999.999996	0.000000	999999.999996	2.200000
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
2.250000	999999.999996	-40.000000	999999.999996	-40.000000	999999.999996	2.250000
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
1.000000	0.000000	18.482757	16.282757	.550526	0.000000	1.000000
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
99999.999996	999999.999996	16.000000	1.649474	4.500000	2.200000	16.000000

DESIGN NO.64325A. AZIMUTH TELESCOPE 4.3X MAGNIFICATION 103177- 0

2 -2 1 .210416=PM(1) -.012500=SIN UM(1) 2.250000=HP(1) 0.000000=TAN UP(1)
2 -2 1 .498972=PM(2) -.009854=SIN UM(2) .085999=HP(2) 0.000000=TAN UP(2)

25.4MM=UNIT OF LENGTH

	RADIUS.ETC	AXL.DSTNCE	.63280 M-INDEX	.48610 L-INDEX	.65630 U-INDEX	GLASS CODE.NAME	1ST.CA	2ND.CA	STATION
		0.0000	1.00000	1.00000	1.00000		0.00	0.00	19.6428
1 CYL	3.6547	.6500	1.63269	1.64909	1.63108	636.353 F6	2.46	.58	19.6428
2 CYL	-6.4870	.2149	1.00000	1.00000	1.00000	0.000	2.46	.54	18.9928
3 CYL	-5.2748	.3500	1.79883	1.82776	1.79609	805.254 SF6	2.45	.51	18.7779
4 CYL	INFINITE	9.5469	1.00000	1.00000	1.00000	0.000	2.45	.49	18.4279
5 CYL	INFINITE	.3500	1.79883	1.82776	1.79609	805.254 SF6	2.33	.35	8.8810
6 CYL	2.2357	.6000	1.63269	1.64909	1.63108	636.353 F6	2.33	.37	8.5310
7 CYL	-2.1304	.2026	1.00000	1.00000	1.00000	0.000	2.32	.40	7.9310
8 CYL	2.5833	.6000	1.63269	1.64909	1.63108	636.353 F6	2.32	.40	7.7284
9 CYL	-3.2796	.3500	1.79883	1.82776	1.79609	805.254 SF6	2.32	.37	7.1284
10 CYL	INFINITE	2.3284	1.00000	1.00000	1.00000	0.000	2.31	.35	6.7784
11 CYL	-1.7898	.3500	1.79883	1.82776	1.79609	805.254 SF6	2.28	.15	4.4500
12 CYL	-5.6466	.0200	1.00000	1.00000	1.00000	0.000	2.28	.14	4.1000
13 CYL	INFINITE	.3500	1.79883	1.82776	1.79609	805.254 SF6	2.28	.14	4.0800
14 CYL	2.4613	.0200	1.00000	1.00000	1.00000	0.000	2.28	.14	3.7300
15 CYL	.9311	.3500	1.79883	1.82776	1.79609	805.254 SF6	2.28	.14	3.7100
16 CYL	1.2905	3.3600	1.00000	1.00000	1.00000	0.000	2.28	.11	3.3600
17 SPH	INFINITE	1.1600	1.00000	1.00000	1.00000	0.000	0.00	0.00	-.0000

FIRST ORDER PARAMETERS ON MERIDIONAL PLANE

OBJECT DSTNCE	FNTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
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OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
2.250000	999999.999996	-40.000000	999999.999996	-40.000000	999999.999996	2.250000
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
1.000000	0.000000	18.482757	16.282757	.550526	0.000000	1.000000
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
999999.999996	999999.999996	16.000000	1.649474	4.500000	2.200000	16.000000

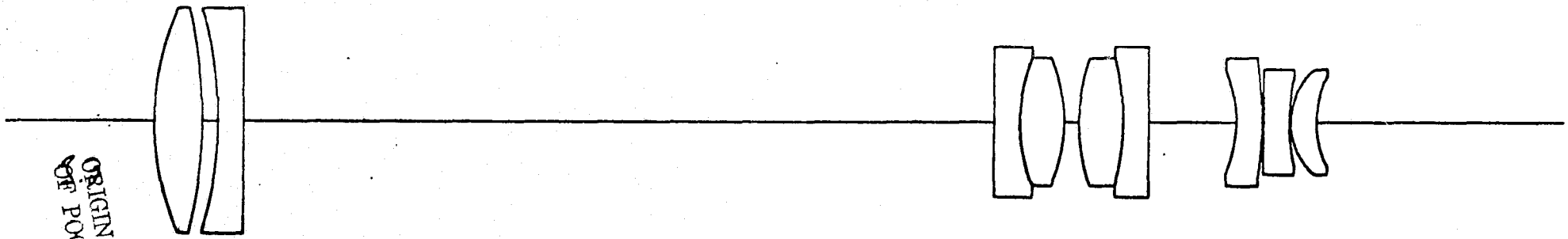
FIRST ORDER PARAMETERS ON EQUATORIAL PLANE

OBJECT DSTNC	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTANCE
50.635310	999999.999996	999999.999996	999999.999	999999.999996	999999.999996	2.1 8
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
.085999	999999.999996	-50.739611	9.573566	11.799992	31933.004880	-.020000
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
-.232560	0.000000	18.482755	16.282757	34.352558	-.000003	-4.299970
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
.149868	6.454348	4.000000	-32.152560	.022304	5.468270	4.000000

DESIGN NO.643258. AZIMUTH TELESCOPE 3.0X MAGNIFICATION. 103177- 0

2	-2	1	.210124=PM(1)	-.012500=SIN UM(1)	2.250000=HP(1)	0.000000=TAN UP(1)
2	-2	1	.233193=PM(2)	-.014124=SIN UM(2)	.060000=HP(2)	0.000000=TAN UP(2)

.63280 .48610 .65630 25.4MM=UNIT OF LENGTH



FIRST ORDER PARAMETERS ON MERIDIONAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
16.809902	999999.999996	0.000000	999999.999996	0.000000	999999.999996	2.700000
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
2.250000	999999.999996	-40.000000	999999.999996	-40.000000	999999.999996	2.250000
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
1.000000	0.000000	18.459376	15.759376	1.050526	0.000000	1.000000
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
9999.999996	999999.999996	16.000000	1.649474	4.500000	2.700000	16.000000

DESIGN NO.643258, AZIMUTH TELESCOPE 3.0X MAGNIFICATION. 103177- 0

?	-2	1	.210124=PM(1)	-.012500=SIN UM(1)	?.250000=HP(1)	0.000000=TAN UP(1)				
?	-2	1	.233193=PM(2)	-.014124=SIN UM(2)	.060000=HP(2)	0.000000=TAN UP(2)				

		RADIUS,ETC	AXL.DSTNCE	.63280 M-INDEX	.48610 L-INDEX	.65630 U-INDEX	GLASS CODE,NAME	25.4MM=UNIT OF LENGTH 1ST.CA	2ND.CA	STATION
			0.0000	1.00000	1.00000	1.00000		0.00	0.00	19.1194
1	CYL	3.6547	.6500	1.63269	1.64909	1.63108	636.353 F6	2.46	.29	19.1194
2	CYL	-6.4870	.2149	1.00000	1.00000	1.00000	0.000	2.46	.27	18.4694
3	CYL	-5.2748	.3500	1.79883	1.82776	1.79609	805.254 SF6	2.45	.25	18.2545
4	CYL	INFINITE	10.1667	1.00000	1.00000	1.00000	0.000	2.45	.24	17.9045
5	CYL	INFINITE	.3500	1.79883	1.82776	1.79609	805.254 SF6	2.32	.31	7.7378
6	CYL	?.2357	.6000	1.63269	1.64909	1.63108	636.353 F6	2.32	.32	7.3878
7	CYL	-2.1304	.2026	1.00000	1.00000	1.00000	0.000	2.32	.34	6.7878
8	CYL	2.5833	.6000	1.63269	1.64909	1.63108	636.353 F6	2.31	.34	6.5852
9	CYL	-3.2796	.3500	1.79883	1.82776	1.79609	805.254 SF6	2.31	.30	5.9852
10	CYL	INFINITE	1.1852	1.00000	1.00000	1.00000	0.000	2.31	.28	5.6352
11	CYL	-1.7898	.3500	1.79883	1.82776	1.79609	805.254 SF6	2.29	.17	4.4500
12	CYL	-5.6466	.0200	1.00000	1.00000	1.00000	0.000	2.29	.17	4.1000
13	CYL	INFINITE	.3500	1.79883	1.82776	1.79609	805.254 SF6	2.29	.17	4.0800
14	CYL	?.4613	.0200	1.00000	1.00000	1.00000	0.000	2.29	.16	3.7300
15	CYL	.9311	.3500	1.79883	1.82776	1.79609	805.254 SF6	2.29	.16	3.7100
16	CYL	1.2905	3.3600	1.00000	1.00000	1.00000	0.000	2.28	.13	3.3600
17	SPH	INFINITE	.6600	1.00000	1.00000	1.00000	0.000	0.00	0.00	-.0000

FIRST ORDER PARAMETERS ON MERIDIONAL PLANE

OBJECT DSTNCE	FNTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
16.809902	999999.999996	0.000000	999999.999996	0.000000	999999.999996	2.700000
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
2.250000	999999.999996	-40.000000	999999.999996	-40.000000	999999.999996	2.250000
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
1.000000	0.000000	18.459376	15.759376	1.050526	0.000000	1.000000
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
999999.999996	999999.999996	16.000000	1.649474	4.500000	2.700000	16.000000

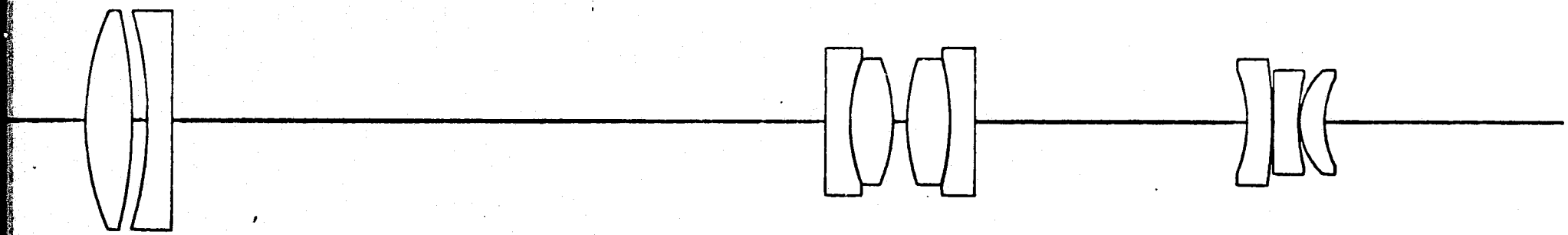
FIRST ORDER PARAMETERS ON EQUATORIAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
16.509998	999999.999996	999999.999996	999999.999996	999999.999996	551508.683662	2.[illegible]00
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
.060000	999999.999996	-35.399933	8.849996	11.800000	46737.795224	-.020000
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
-.333334	0.000000	18.459376	15.759376	.750623	.000002	-2.999994
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
.214809	6.454348	4.000000	1.949377	.037222	4.095647	4.000000

DESIGN NO.64325C. AZIMUTH TELESCOPE 6.0X MAGNIFICATION. 103177- 0

2	-2	1	.205913=PM(1)	-.012500=SIN UM(1)	2.250000=HP(1)	0.000000=TAN UP(1)
2	-2	1	.538651=PM(2)	-.007062=SIN UM(2)	.120005=HP(2)	0.000000=TAN UP(2)

.63280 .48610 .65630 25.4MM=UNIT OF LENGTH



FIRST ORDER PARAMETERS ON MERIDIONAL PLANE

OBJECT DSTNCE	FNTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
16.473002	999999.999996	0.000000	999999.999996	0.000000	999999.999996	.750000
OBJECT HEIGHT	FNTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
2.250000	999999.999996	-40.000000	999999.999996	-40.000000	999999.999996	2.250000
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
1.000000	0.000000	18.122476	17.372476	-.899474	0.000000	1.000000
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
999999.999996	999999.999996	16.000000	1.649474	4.500000	.750000	16.000000

DESIGN NO.64325C. AZIMUTH TELESCOPE 6.0X MAGNIFICATION. 103177- 0

2	-2	1	.205913=PM(1)	-.012500=SIN UM(1)	2.250000=HP(1)	0.000000=TAN UP(1)
2	-2	1	.538651=PM(2)	-.007062=SIN UM(2)	.120005=HP(2)	0.000000=TAN UP(2)

	RADIUS.ETC	AXL.DSTNCE	.63280 M-INDEX	.48610 L-INDEX	.65630 U-INDEX	GLASS CODE.NAME	25.4MM=UNIT OF LENGTH 1ST.CA	2ND.CA	STATION
		0.0000	1.00000	1.00000	1.00000		0.00	0.00	20.7325
1 CYL	3.6547	.6500	1.63269	1.64909	1.63108	636.353 F6	2.46	.66	20.7325
2 CYL	-6.4870	.2149	1.00000	1.00000	1.00000	0.000	2.45	.62	20.0825
3 CYL	-5.2748	.3500	1.79883	1.82776	1.79609	805.254 SF6	2.45	.58	19.8676
4 CYL	INFINITE	9.1417	1.00000	1.00000	1.00000	0.000	2.45	.56	19.5176
5 CYL	INFINITE	.3500	1.79883	1.82776	1.79609	805.254 SF6	2.33	.31	10.3759
6 CYL	2.2357	.6000	1.63269	1.64909	1.63108	636.353 F6	2.33	.33	10.0259
7 CYL	-2.1304	.2026	1.00000	1.00000	1.00000	0.000	2.32	.37	9.4259
8 CYL	2.5833	.6000	1.63269	1.64909	1.63108	636.353 F6	2.32	.37	9.2233
9 CYL	-3.2796	.3500	1.79883	1.82776	1.79609	805.254 SF6	2.32	.34	8.6233
10 CYL	INFINITE	3.8233	1.00000	1.00000	1.00000	0.000	2.31	.33	8.2733
11 CYL	-1.7898	.3500	1.79883	1.82776	1.79609	805.254 SF6	2.27	.08	4.4500
12 CYL	-5.6466	.0200	1.00000	1.00000	1.00000	0.000	2.26	.07	4.1000
13 CYL	INFINITE	.3500	1.79883	1.82776	1.79609	805.254 SF6	2.26	.07	4.0800
14 CYL	2.4613	.0200	1.00000	1.00000	1.00000	0.000	2.26	.07	3.7300
15 CYL	.9311	.3500	1.79883	1.82776	1.79609	805.254 SF6	2.26	.07	3.7100
16 CYL	1.2905	3.3600	1.00000	1.00000	1.00000	0.000	2.26	.05	3.3600
17 SPH	INFINITE	2.6100	1.00000	1.00000	1.00000	0.000	0.00	0.00	-.0000

FIRST ORDER PARAMETERS ON MERIDIONAL PLANE

BJECT DSTNCE	FNTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
16.473002	999999.999996	0.000000	999999.999996	0.000000	999999.999996	.750000
BJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
2.250000	999999.999996	-40.000000	999999.999996	-40.000000	999999.999996	2.250000
AGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
1.000000	0.000000	18.122476	17.372476	-.899474	0.000000	1.000000
PT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
9999.999996	999999.999996	16.000000	1.649474	4.500000	.750000	16.000000

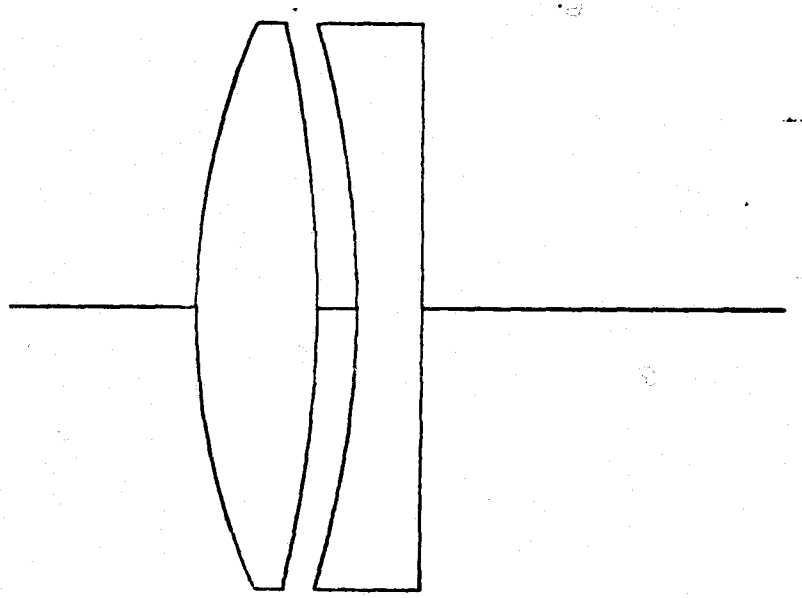
FIRST ORDER PARAMETERS ON EQUATORIAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
76.275940	999999.999996	999999.999996	999999.999	501425.957512	71630.536572	.7 00
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
.120005	999999.999996	-70.802751	10.114342	11.800000	6070.320896	-.020000
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
-.166660	0.000000	18.122476	17.372476	58.903470	.000016	-6.000233
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
.107400	6.454348	4.000000	-58.153470	.021655	5.768262	4.000000

DESIGN NO.64325D. FIRST GOUP. AZIMUTH TELESCOPE. 103177- 0

2	-2	1	.082198=PM(1)	-.012500=SIN UM(1)	2.250000=HP(1)	0.000000=TAN UP(1)
2	-2	1	.538651=PM(2)	-.007062=SIN UM(2)	.120005=HP(2)	0.000000=TAN UP(2)

.63280 .48610 .65630 25.4MM=UNIT OF LENGTH



FIRST ORDER PARAMETERS ON MERIDIONAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
6.575854	999999.999996	0.000000	999999.999996	0.000000	999999.999996	5.768300
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
2.250000	999999.999996	-40.000000	999999.999996	-40.000000	999999.999996	2.250000
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
1.000000	0.000000	6.983166	1.214866	5.360988	0.000000	1.000000
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
999999.999996	999999.999996	4.000000	.407312	4.500000	5.768300	4.000000

DESIGN NO.64325D. FIRST GOUP. AZIMUTH TELESCOPE. 103177- 0

2	-2	1	.082198=PM(1)	-.012500=SIN UM(1)	2.250000=HP(1)	0.000000=TAN UP(1)
2	-2	1	.538651=PM(2)	-.007062=SIN UM(2)	.120005=HP(2)	0.000000=TAN UP(2)

	RADIUS.ETC	AXL.DSTNCE	.63280 M-INDEX	.48610 L-INDEX	.65630 U-INDEX	GLASS CODE.NAME	1ST.CA	2ND.CA	25.4MM=UNIT OF LENGTH STATION
		0.0000	1.00000	1.00000	1.00000		0.00	0.00	10.3566
1 CYL	3.6547	.6500	1.63269	1.64909	1.63108	636.353 F6	4.00	1.50	10.3566
2 CYL	-6.4870	.2149	1.00000	1.00000	1.00000	0.000	4.00	1.50	9.7066
3 CYL	-5.2748	.3500	1.79883	1.82776	1.79609	805.254 SF6	4.00	1.50	9.4917
4 CYL	INFINITE	9.1417	1.00000	1.00000	1.00000	0.000	4.00	1.50	9.1417
5 SPH	INFINITE	3.3734	1.00000	1.00000	1.00000	0.000	0.00	0.00	.0000

FIRST ORDER PARAMETERS ON MERIDIONAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
6.575854	999999.999996	0.000000	999999.999996	0.000000	999999.999996	5.768300
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
2.250000	999999.999996	-40.000000	999999.999996	-40.000000	999999.999996	2.250000
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
1.000000	0.000000	6.983166	1.214866	5.360988	0.000000	1.000000
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
99999.999996	999999.999996	4.000000	.407312	4.500000	5.768300	4.000000

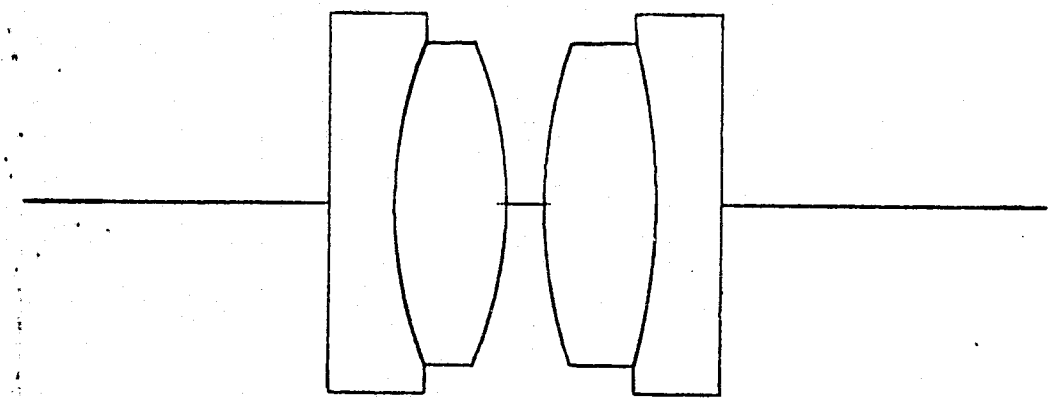
FIRST ORDER PARAMETERS ON EQUATORIAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
76.275946	999999.999996	-.401046	7.604222	-1.149874	6.454348	5.768262
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
.120005	999999.999996	-70.802751	-7.021661	-6.388136	.107400	.010827
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
.090224	0.000000	6.983128	1.214866	75.061080	-.904128	11.083476
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
99999.999996	999999.999996	1.000000	-69.292819	.021655	5.768262	4.000000

DESIGN NO.64325E, SECOND GROUP, AZIMUTH TELESCOPE. 103177- 0

2	-2	1	.077132=PM(1)	-.012500=SIN UM(1)	2.250000=HP(1)	0.000000=TAN UP(1)
2	-2	1	-.264039=PM(2)	-.078270=SIN UM(2)	-.042410=HP(2)	-.015781=TAN UP(2)

.63280 .48610 .65630 25.4MM=UNIT OF LENGTH



FIRST ORDER PARAMETERS ON MERIDIONAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
6.170537	999999.999996	0.000000	999999.999996	0.000000	999999.999996	4.843800
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
2.250000	999999.999996	-40.000000	999999.999996	-40.000000	999999.999996	2.250000
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
1.000000	0.000000	6.946411	2.102610	4.067927	0.000000	1.000000
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
999999.999996	999999.999996	6.000000	.775873	4.500000	4.843800	6.000000

DESIGN NO.64325E, SECOND GROUP, AZIMUTH TELESCOPE. 103177- 0

2	-2	1	.077132=PM(1)	-.012500=SIN UM(1)	2.250000=HP(1)	0.000000=TAN UP(1)
2	-2	1	-.264039=PM(2)	-.078270=SIN UM(2)	-.042410=HP(2)	-.015781=TAN UP(2)

25.4MM=UNIT OF LENGTH

	RADIUS,ETC	AXL.DSTNCE	.63280 M-INDEX	.48610 L-INDEX	.65630 U-INDEX	GLASS CODE,NAME	1ST.CA	2ND.CA	STATION
		0.0000	1.00000	1.00000	1.00000		0.00	0.00	5.9259
1 CYL	INFINITE	.3500	1.79883	1.82776	1.79609	805.254 SF6	3.20	1.00	5.9259
2 CYL	2.2357	.6000	1.63269	1.64909	1.63108	636.353 F6	3.20	.85	5.5759
3 CYL	-2.1304	.2026	1.00000	1.00000	1.00000	0.000	3.20	.85	4.9759
4 CYL	2.5833	.6000	1.63269	1.64909	1.63108	636.353 F6	3.20	.85	4.7733
5 CYL	-3.2796	.3500	1.79883	1.82776	1.79609	805.254 SF6	3.20	.85	4.1733
6 CYL	INFINITE	3.8233	1.00000	1.00000	1.00000	0.000	3.20	1.00	3.8233
7 SPH	INFINITE	-1.0205	1.00000	1.00000	1.00000	0.000	0.00	0.00	.0000

FIRST ORDER PARAMETERS ON MERIDIONAL PLANE

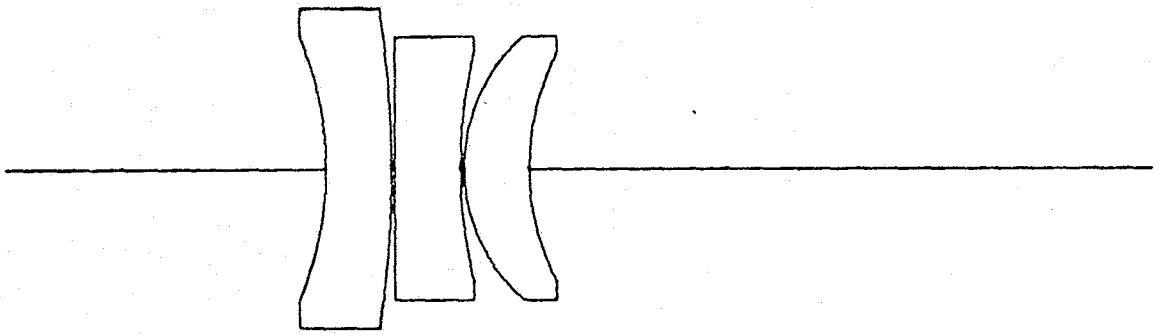
OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
6.170537	999999.999996	0.000000	999999.999996	0.000000	999999.999996	4.843800
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
2.250000	999999.999996	-40.000000	999999.999996	-40.000000	999999.999996	2.250000
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
1.000000	0.000000	6.946411	2.102610	4.067927	0.000000	1.000000
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
999999.999996	999999.999996	6.000000	.775873	4.500000	4.843800	6.000000

FIRST ORDER PARAMETERS ON EQUATORIAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
-3.373438	-2.687409	.663155	2.325500	-.642248	6.958975	4.843777
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
.010826	.107391	-6.388144	3.680240	8.681955	.243632	-.014714
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
-1.359073	-.904110	6.946387	2.102610	-5.476049	.398552	-.735796
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
.107391	-2.687409	1.000000	10.319826	.029427	4.843777	6.000000

DESIGN NO.64325F. THIRD GROUP, AZIMUTH TELESCOPE. 103177- 0

2	-2	1	.205913=PM(1)	-.012500=SIN UM(1)	2.250000=HP(1)	0.000000=TAN UP(1)
2	-2	1	-.058770=PM(2)	.057591=SIN UM(2)	-.021813=HP(2)	.006956=TAN UP(2)
				.63280 .48610 .65630		25.4MM=UNIT OF LENGTH



FIRST ORDER PARAMETERS ON MERIDIONAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
16.473002	999999.999996	0.000000	999999.999996	0.000000	999999.999996	15.849291
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
2.250000	999999.999996	-40.000000	999999.999996	-40.000000	999999.999996	2.250000
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
1.000000	0.000000	16.939291	1.090000	15.383002	0.000000	1.000000
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
99999.999996	999999.999996	6.000000	.466288	4.500000	15.849291	6.000000

DESIGN NO.64325F. THIRD GROUP, AZIMUTH TELESCOPE. 103177- 0

****

2	-2	1	.205913=PM(1)	-.012500=SIN UM(1)	2.250000=HP(1)	0.000000=TAN UP(1)
2	-2	1	-.058770=PM(2)	.057591=SIN UM(2)	-.021813=HP(2)	.006956=TAN UP(2)

.63280 .48610 .65630 25.4MM=UNIT OF LENGTH

	RADIUS.ETC	AXL.DSTNCE	M-INDEX	L-INDEX	U-INDEX	GLASS CODE,NAME	1ST.CA	2ND.CA	STATION
		0.0000	1.00000	1.00000	1.00000		0.00	0.00	4.4500
1 CYL	-1.7898	.3500	1.79883	1.82776	1.79609	805.254 SF6	3.20	.70	4.4500
2 CYL	-5.6466	.0200	1.00000	1.00000	1.00000	0.000	3.20	.85	4.1000
3 CYL	INFINITE	.3500	1.79883	1.82776	1.79609	805.254 SF6	3.20	.70	4.0800
4 CYL	2.4613	.0200	1.00000	1.00000	1.00000	0.000	3.20	.60	3.7300
5 CYL	.9311	.3500	1.79883	1.82776	1.79609	805.254 SF6	3.20	.70	3.7100
6 CYL	1.2905	3.3600	1.00000	1.00000	1.00000	0.000	3.20	.60	3.3600
7 SPH	INFINITE	2.6100	1.00000	1.00000	1.00000	0.000	0.00	0.00	.0000

FIRST ORDER PARAMETERS ON MERIDIONAL PLANE

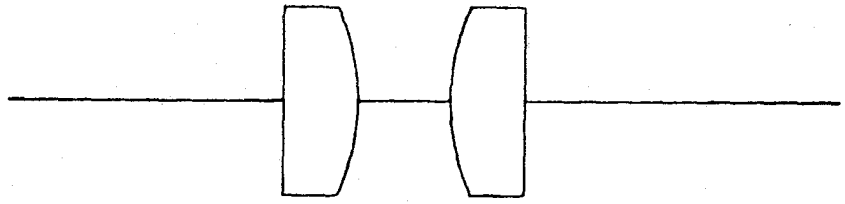
OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
16.473002	999999.999996	0.000000	999999.999996	0.000000	999999.999996	15.849291
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
2.250000	999999.999996	-40.000000	999999.999996	-40.000000	999999.999996	2.250000
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
1.000000	0.000000	16.939291	1.090000	15.383002	0.000000	1.000000
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
999999.999996	999999.999996	6.000000	.466288	4.500000	15.849291	6.000000

FIRST ORDER PARAMETERS ON EQUATORIAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
1.020476	3.135854	.260671	-2.875412	-.282684	36027.974458	.750000
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
-.014715	.243654	8.681894	-32.855825	11.799934	3053.171818	-.019999
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
1.359143	.398543	1.840000	1.090000	-.069524	.000032	.735758
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
.243654	3.135854	1.000000	.819524	.039998	.750000	6.000000

DESIGN NO.64325J. PAIR OF AUXILIARY LENSES (TILTED CYLINDER). 103177- 0

?	-?	1	.027671=PM(1)	-.012439=SIN UM(1)	-1.000000=HP(1)	0.000000=TAN UP(1)
?	-?	1	-.056028=PM(2)	-.043778=SIN UM(2)	.020000=HP(2)	0.000000=TAN UP(2)
				.63280 .48610 .65630		25.4MM=UNIT OF LENGTH



FIRST ORDER PARAMETERS ON MERIDIONAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
2.224533	999999.999996	0.000000	999999.999996	0.000000	999999.999996	1.279800
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
-1.000000	999999.999996	-40.196157	999999.999996	-40.196157	999999.999996	-1.000000
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
1.000000	0.000000	2.579800	1.300000	.924533	0.000000	1.000000
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
99999.999996	999999.999996	4.000000	.355267	2.000000	1.279800	4.000000

DESIGN NO.64325J. PAIR OF AUXILIARY LENSES (TILTED CYLINDER). 103177- 0

2	-2	1	.027671=PM(1)	-.012439=SIN UM(1)	-1.000000=HP(1)	0.000000=TAN UP(1)
2	-2	1	-.056028=PM(2)	-.043778=SIN UM(2)	.020000=HP(2)	0.000000=TAN UP(2)

25.4MM=UNIT OF LENGTH

	RADIUS.ETC	AXL.DSTNCE	.63280 M-INDEX	.48610 L-INDEX	.65630 U-INDEX	GLASS CODE.NAME	1ST.CA	2ND.CA	STATION
		0.0000	1.00000	1.00000	1.00000		0.00	0.00	2.5800
1 CYL	INFINITE	.4000	1.79883	1.82776	1.79609	805.254 SF6	.97	.04	2.5800
2 CYL	-1.2000	.5000	1.00000	1.00000	1.00000	0.000	.98	.05	2.1800
3 CYL	1.2000	.4000	1.79883	1.82776	1.79609	805.254 SF6	.98	.05	1.6800
4 CYL	INFINITE	1.2800	1.00000	1.00000	1.00000	0.000	.98	.05	1.2800
5 SPH	INFINITE	.0002	1.00000	1.00000	1.00000	0.000	0.00	0.00	0.0000

FIRST ORDER PARAMETERS ON MERIDIONAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
2.224533	999999.999996	0.000000	999999.999996	0.000000	999999.999996	1.279800
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
-1.000000	999999.999996	-40.196157	999999.999996	-40.196157	999999.999996	-1.000000
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
1.000000	0.000000	2.579800	1.300000	.924533	0.000000	1.000000
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
999999.999996	999999.999996	4.000000	.355267	2.000000	1.279800	4.000000

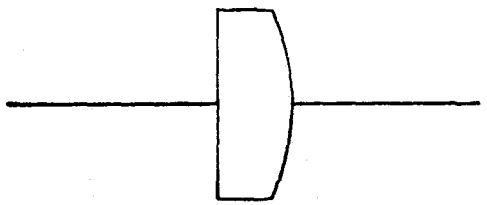
FIRST ORDER PARAMETERS ON EQUATORIAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
-1.279826	999999.999996	.522279	.901052	-.522279	.378773	1.279825
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
.020000	999999.999996	-11.421262	5.710630	11.421256	.078893	-.020000
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
-1.000000	0.000000	2.579825	1.300000	-2.579826	-1.271545	-1.000000
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
.078893	.378773	4.000000	3.859651	.040000	1.279825	4.000000

DESIGN NO.64325K. AUXILIARY LENS ELEMENT. - 0

2	-2	0	.018685=PM(1)	-.012439=SIN UM(1)	-.966073=HP(1)	0.000000=TAN UP(1)
1	-2	0	-.064897=PM(2)	0.000000=SIN UM(2)	.003645=HP(2)	-.003574=TAN UP(2)

.63280 .48613 .65627 25.4MM=UNIT OF LENGTH



FIRST ORDER PARAMETERS ON MERIDIONAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
1.502166	999999.999996	0.000000	999999.999996	0.000000	999999.999996	1.279800
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
-.966073	999999.999996	-40.196157	999999.999996	-40.196157	999999.999996	-.966073
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
1.000000	0.000000	1.679800	.400000	1.102166	0.000000	1.000000
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
99999.999996	999999.999996	2.000000	.177634	1.932146	1.279800	2.000000

DESIGN NO.64325K. AUXILIARY LENS ELEMENT. - 0

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2 -2 0	.018685=PM(1)	-.012439=SIN UM(1)	-.966073=HP(1)	0.000000=TAN UP(1)	
1 -2 0	-.064897=PM(2)	0.000000=SIN UM(2)	.003645=HP(2)	-.003574=TAN UP(2)	

.63280 .48613 .65627 25.4MM=UNIT OF LENGTH

	RADIUS.ETC	AXL.DSTNCE	M-INDEX	L-INDEX	U-INDEX	GLASS CODE.NAME	1ST.CA	2ND.CA	STATION
		0.0000	1.00000	1.00000	1.00000		1.00	0.00	.4000
1 CYL	1.2000	.4000	1.79883	1.82775	1.79609	805.254 SF6	3.20	.50	.4000
2 CYL	INFINITE	0.0000	1.00000	1.00000	1.00000	0.000	3.20	.50	0.0000
3 SPH	INFINITE	-1.2798	1.00000	1.00000	1.00000	0.000	0.00	0.00	0.0000

FIRST ORDER PARAMETERS ON MERIDIONAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
1.502166	999999.999996	0.000000	999999.999996	0.000000	999999.999996	1.279800
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
-.966073	999999.999996	-40.196157	999999.999996	-40.196157	999999.999996	-.966073
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
1.000000	0.000000	1.679800	.400000	1.102166	0.000000	1.000000
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
999999.999996	999999.999996	2.000000	.177634	1.932146	1.279800	2.000000

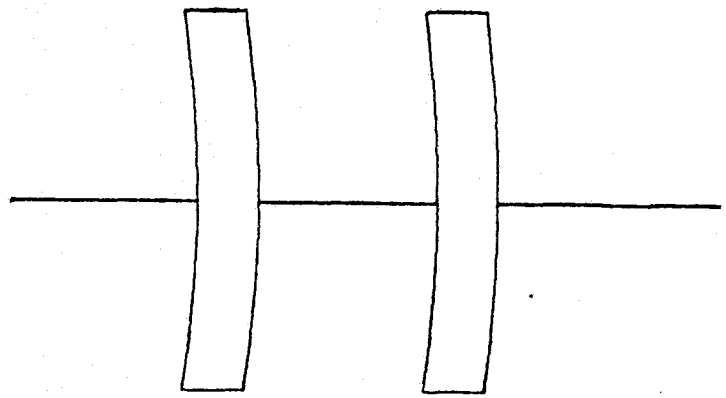
FIRST ORDER PARAMETERS ON EQUATORIAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
999999.999996	1.019866	.000000	1.502192	-.222366	.385088	1.279825
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
999999.999996	.129794	999999.999996	11.573661	11.573661	.077308	-.005369
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
0.000000	-.204774	1.679825	.400000	999999.999996	-.343797	999999.999996
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
.077308	.385088	2.000000	999999.999996	.010738	1.279825	2.000000

DESIGN NO.64325L. RANGE CURVATURE CORRECTOR. 112277- 0

3	-2	0	1.000000=PM(1)	0.000000=SIN UM(1)	0.000000=HP(1)	.010000=TAN UP(1)
3	-2	0	1.000000=PM(2)	0.000000=SIN UM(2)	0.000000=HP(2)	.010000=TAN UP(2)

.63280 .48613 .65627 25.4MM=UNIT OF LENGTH



FIRST ORDER PARAMETERS ON MERIDIONAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
99999.999996	0.000000	-6332.998839	999999.999996	-6581.132926	-1.374306	999999.999996
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
99999.999996	2.000000	999999.999996	84433.540086	84433.540086	2.077928	-1688.670802
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
1.038964	.572939	999999.999996	1.617500	999999.999996	.551453	.962497
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
2.000000	0.000000	1.000000	999999.999996	3377.341603	999999.999996	4.000000

DESIGN NO.64325L, RANGE CURVATURE CORRECTOR. 112277- 0

3 -2 0 1.000000=PM(1) 0.000000=SIN UM(1) 0.000000=HP(1) .010000=TAN UP(1)
3 -2 0 1.000000=PM(2) 0.000000=SIN UM(2) 0.000000=HP(2) .010000=TAN UP(2)

				.63280	.48613	.65627				25.4MM=UNIT OF LENGTH
	RADIUS,ETC	AXL.DSTNCE	M-INDEX	L-INDEX	U-INDEX	GLASS CODE,NAME	1ST.CA	2ND.CA		STATION
		0.0000	1.00000	1.00000	1.00000		1.00	0.00		2.8175
1 SPH	-6.6582	.3302	1.80037	1.82937	1.79762	805.254 SF6	1.00	0.00		2.8175
2 CYL	-6.6582	.9617	1.00000	1.00000	1.00000	0.000	1.00	0.00		2.4873
3 CYL	-7.3958	.3256	1.80037	1.82937	1.79762	805.254 SF6	1.00	0.00		1.5256
4 SPH	-7.7230	1.2000	1.00000	1.00000	1.00000	0.000	1.00	0.00		1.2000
5 SPH	INFINITE	2.7372	1.00000	1.00000	1.00000	0.000	0.00	0.00		0.0000

FIRST ORDER PARAMETERS ON MERIDIONAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
99999.999996	0.000000	-6332.998839	999999.999996	-6581.132926	-1.374306	999999.999996
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
99999.999996	2.000000	999999.999996	84433.540086	84433.540086	2.077928	-1688.670802
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
1.038964	.572939	999999.999996	1.617500	999999.999996	.551453	.962497
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
2.000000	0.000000	1.000000	999999.999996	3377.341603	999999.999996	4.000000

FIRST ORDER PARAMETERS ON EQUATORIAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
99999.999996	0.000000	-2492.074773	-18135.368476	-2890.615102	-1.537192	-21025.983578
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
99999.999996	2.000000	999999.999996	9067.684238	9067.684238	2.318613	-181.353685
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
1.159306	.572939	-21024.366078	1.617500	999999.999996	.494212	.862585
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
2.000000	0.000000	1.000000	999999.999996	362.707370	-21025.983578	4.000000

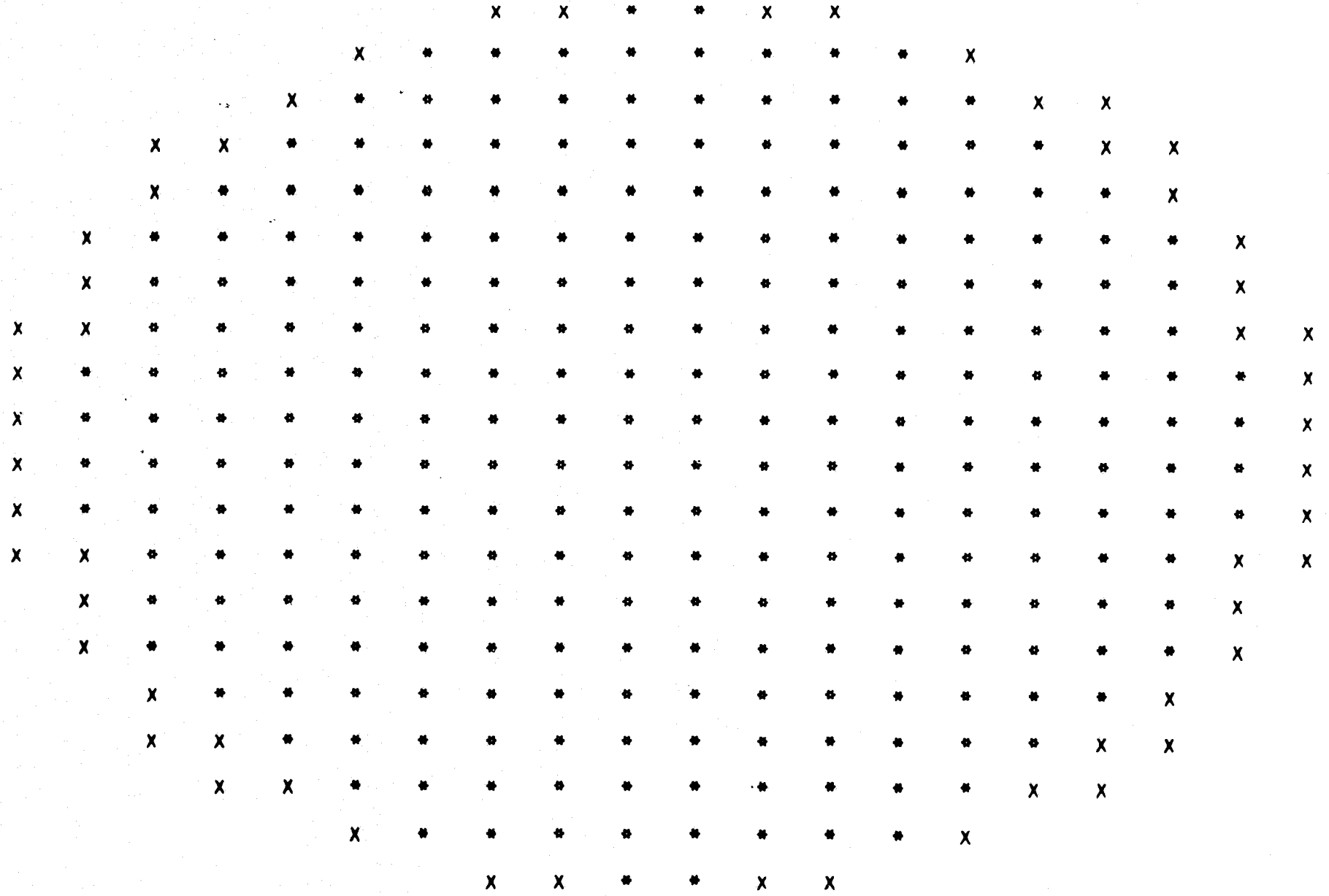
DESIGN NO.64325L. RANGE CURVATURE CORRECTOR. 112277- 0

ELD POINT NO. 0 0.000000=H(Y) 0.000000=H(Z) 0.000000=G(Y) 1.000000=E(Y) 1.000000=E(Z)

0.000000=HPR(Y) 0.000000=HPR(Z) 1.038962=NA(Y) 1.160456=NA(Z)

.6328=REFERENCE FOCUS WAVELENGTH .6328=RAY TRACING WAVELENGTH

316 RAYS THROUGH ENTRANCE PUPIL 260 RAYS THROUGH EXIT PUPIL 56 VIGNETTED RAYS

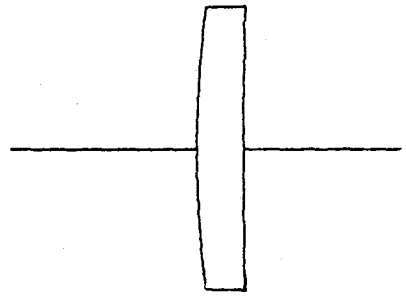


WAVE ABERRATION (WAVELENGTH UNITS)

						.11	.12	.12	.12	.12	.11											
					.02	.02	.03	.05	.06	.06	.05	.03	.02	.02								
				-.02	-.06	-.06	-.04	-.02	.01	.02	.02	.01	-.02	-.04	-.06	-.06	-.02					
			-.03	-.11	-.13	-.11	-.08	-.05	-.02	-.00	-.00	-.02	-.05	-.08	-.11	-.13	-.11	-.03				
			-.11	-.17	-.18	-.15	-.11	-.07	-.03	-.01	-.01	-.03	-.07	-.11	-.15	-.18	-.17	-.11				
		-.06	-.18	-.22	-.21	-.17	-.12	-.07	-.04	-.02	-.02	-.04	-.07	-.12	-.17	-.21	-.22	-.18	-.06			
		-.12	-.22	-.25	-.23	-.19	-.13	-.08	-.04	-.01	-.01	-.04	-.08	-.13	-.19	-.23	-.25	-.22	-.12			
	.02	-.16	-.26	-.28	-.25	-.20	-.14	-.08	-.03	-.01	-.01	-.03	-.08	-.14	-.20	-.25	-.28	-.26	-.16	.02		
	-.01	-.19	-.28	-.29	-.26	-.20	-.14	-.08	-.03	-.01	-.01	-.03	-.08	-.14	-.20	-.26	-.29	-.28	-.19	-.01		
	-.03	-.21	-.29	-.30	-.26	-.20	-.14	-.08	-.03	-.00	-.00	-.03	-.08	-.14	-.20	-.26	-.30	-.29	-.21	-.03		
	-.03	-.21	-.29	-.30	-.26	-.20	-.14	-.08	-.03	-.00	-.00	-.03	-.08	-.14	-.20	-.26	-.30	-.29	-.21	-.03		
	-.01	-.19	-.28	-.29	-.26	-.20	-.14	-.08	-.03	-.01	-.01	-.03	-.08	-.14	-.20	-.26	-.29	-.28	-.19	-.01		
	.03	-.16	-.26	-.28	-.25	-.20	-.14	-.08	-.03	-.01	-.01	-.03	-.08	-.14	-.20	-.25	-.28	-.26	-.16	.03		
		-.12	-.22	-.25	-.24	-.19	-.13	-.08	-.04	-.01	-.01	-.04	-.08	-.13	-.19	-.24	-.25	-.22	-.12			
		-.06	-.18	-.22	-.21	-.17	-.12	-.08	-.04	-.02	-.02	-.04	-.08	-.12	-.17	-.21	-.22	-.18	-.06			
			-.11	-.17	-.18	-.15	-.11	-.07	-.03	-.01	-.01	-.03	-.07	-.11	-.15	-.18	-.17	-.11				
			-.03	-.10	-.13	-.11	-.08	-.05	-.02	-.00	-.00	-.02	-.05	-.08	-.11	-.13	-.10	-.03				
				-.02	-.06	-.06	-.04	-.02	.01	.02	.02	.01	-.02	-.04	-.06	-.06	-.02					
					.02	.02	.03	.05	.06	.06	.05	.03	.02	.02								
						.11	.12	.12	.12	.12	.11											

DESIGN NO.64325M. SHIFT LENS. 103177- 0

0	-2	1	.750000=PM(1)	0.000000=SIN UM(1)	0.000000=HP(1)	.010000=TAN UP(1)		
0	-2	1	.750000=PM(2)	0.000000=SIN UM(2)	0.000000=HP(2)	.010000=TAN UP(2)		
				.63280 .48610 .65630		25.4MM=UNIT OF LENGTH		



FIRST ORDER PARAMETERS ON MERIDIONAL PLANE

OBJECT DSTNCE	FNTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
99999.999996	0.000000	.138979	-37.976025	-.000000	-.138472	-37.976025
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
99999.999996	1.500000	999999.999996	25.317350	25.317350	1.494531	-.379760
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
0.000000	.572939	-37.726025	.250000	999999.999996	.575035	0.000000
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
1.500000	0.000000	1.000000	999999.999996	.759520	-37.976025	2.000000

DESIGN NO.64325M. SHIFT LENS. 103177- 0

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0	-2	1	.750000=PM(1)	0.000000=SIN UM(1)	0.000000=HP(1)	.010000=TAN UP(1)
0	-2	1	.750000=PM(2)	0.000000=SIN UM(2)	0.000000=HP(2)	.010000=TAN UP(2)

	RADIUS.ETC	AXL.DSTNCE	.63280 M-INDEX	.48610 L-INDEX	.65630 U-INDEX	GLASS CODE.NAME	25.4MM=UNIT OF LENGTH 1ST.CA	2ND.CA	STATION
		0.0000	1.00000	1.00000	1.00000		0.00	0.00	1.4500
1 CYL	5.6253	.2500	1.79883	1.82776	1.79609	805.254 SF6	.50	0.00	1.4500
2 SPH	30.3365	1.2000	1.00000	1.00000	1.00000	0.000	.50	0.00	1.2000
3 SPH	INFINITE	-7.2364	1.00000	1.00000	1.00000	0.000	0.00	0.00	0.0000

FIRST ORDER PARAMETERS ON MERIDIONAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
99999.999996	0.000000	.138979	-37.976025	-.000000	-.138472	-37.976025
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
99999.999996	1.500000	999999.999996	25.317350	25.317350	1.494531	-.379760
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
0.000000	.572939	-37.726025	.250000	999999.999996	.575035	0.000000
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
1.500000	0.000000	1.000000	999999.999996	.759520	-37.976025	2.000000

FIRST ORDER PARAMETERS ON EQUATORIAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
99999.999996	0.000000	-.031496	8.606300	-.169853	-.138472	8.436446
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
99999.999996	1.500000	999999.999996	-5.737533	-5.737533	1.494531	.086063
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
0.000000	.572939	8.686446	.250000	999999.999996	.575035	0.000000
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
1.500000	0.000000	1.000000	999999.999996	.172126	8.436446	2.000000

PART II

EVALUATION OF WAVE ABERRATION IN TERMS OF LEGENDRE POLYNOMIALS

NOTES

In optical systems where the aperture is square or rectangular the wave aberration function $W(x,y)$ can be expanded in terms of Legendre orthogonal polynomials

$$W(x,y) = \Sigma\Sigma\ A'_{nm}\ P_n(x)\ P_m(y)$$

where x,y are rectangular coordinates in the exit pupil normalized to an extreme value of unity and P_n , P_m are Legendre polynomials of order n and m respectively. In practice even if the series is truncated beyond terms where m+n=8, the expansion provides an excellent approximation.

The advantage of this polynomial expansion is that the Strehl Intensity Ratio, SIR, is related to the coefficients of the expansion by the formula

$$SIR = 1 - 4\pi^2\Sigma\Sigma A_{nm}^2$$

where

$$A_{nm} = A'_{nm}/\sqrt{(2n+1)(2m+1)}$$

A system where SIR>80% is generally considered as an acceptable performance, hence

$$\sqrt{\Sigma\Sigma A_{nm}^2} < 0.07\lambda$$

Therefore any aberration coefficient $A_{nm}>0.07\lambda$ denotes a large aberration.

Phase G

$ASSIGN 15,15
$TD

DESIGN NO.64325G, JPL CORRELATOR, RANGE CURVATURE CORRECTOR, SHIFT AND AUXILIARY LENSES 103177- 0

2 -2 1 .332500=PM(1) 0.000000=SIN UM(1) 1.000000=HP(1) 0.000000=TAN UP(1)
2 -2 1 1.650000=PM(2) 0.000000=SIN UM(2) .025000=HP(2) 0.000000=TAN UP(2)

		RADIUS,ETC	AXL.DSTNCE	.63280 M-INDEX	.48610 L-INDEX	.65630 U-INDEX	GLASS CODE,NAME		25.4MM=UNIT OF LENGTH 1ST.CA	2ND.CA	STATION
			0.0000	1.00000	1.00000	1.00000			0.00	0.00	132.0518
1	RPH	********* .0000	18.0000	1.00000	1.00000	1.00000	-.000	XXXXXX	0.00	0.00	132.0518
2	SPH	-10.4469	1.8839	1.74969	1.77469	1.74729	755.276	SF4	0.00	0.00	114.0518
3	SPH	-13.4336	.0307	1.00000	1.00000	1.00000	0.000		0.00	0.00	112.1679
4	SPH	31.1330	1.3652	1.74969	1.77469	1.74729	755.276	SF4	0.00	0.00	112.1372
5	SPH	-24.5830	5.5793	1.00000	1.00000	1.00000	0.000		0.00	0.00	110.7720
6	SPH	-14.9126	1.3477	1.50671	1.51423	1.50592	508.612	ZKN7	0.00	0.00	105.1927
7	SPH	15.8548	3.6306	1.00000	1.00000	1.00000	0.000		0.00	0.00	103.8450
8	SPH	24.5464	1.3652	1.74969	1.77469	1.74729	755.276	SF4	0.00	0.00	100.2144
9	SPH	-34.5304	3.5303	1.00000	1.00000	1.00000	0.000		0.00	0.00	98.8492
10	SPH	13.1420	1.8553	1.74969	1.77469	1.74729	755.276	SF4	0.00	0.00	95.3189
11	SPH	10.5330	16.0000	1.00000	1.00000	1.00000	0.000		0.00	0.00	93.4636
12	RTN	-.0587	-.1653	1.00000	1.00000	1.00000	0.000		0.00	0.00	77.4636
13	SPH	-6.6582	.3305	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	77.6288
14	CYL	-6.6582	-.1653	1.00000	1.00000	1.00000	0.000		0.00	0.00	77.2983
15	RTN	.0587	1.2919	1.00000	1.00000	1.00000	0.000		0.00	0.00	77.4636
16	RTN	.0587	-.1630	1.00000	1.00000	1.00000	0.000		0.00	0.00	76.1717
17	CYL	-7.3958	.3260	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	76.3347
18	SPH	-7.7230	-.1630	1.00000	1.00000	1.00000	0.000		0.00	0.00	76.0087
19	RTN	-.0587	1.2522	1.00000	1.00000	1.00000	0.000		0.00	0.00	76.1717
20	CYL	5.6253	.2500	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	74.9195
21	SPH	30.3365	17.9790	1.00000	1.00000	1.00000	0.000		0.00	0.00	74.6695
22	SPH	-10.5330	1.8553	1.74969	1.77469	1.74729	755.276	SF4	0.00	0.00	56.6905
23	SPH	-13.1420	3.5303	1.00000	1.00000	1.00000	0.000		0.00	0.00	54.8352

24	SPH	34.5304	1.3652	1.74969	1.77469	1.74729	755.276	SF4	0.00	0.00	51.3049
25	SPH	-24.5464	3.6303	1.00000	1.00000	1.00000	0.000		0.00	0.00	49.9397
26	SPH	-15.8548	1.3477	1.50671	1.51423	1.50592	508.612	ZKN7	0.00	0.00	46.3094
27	SPH	14.9126	5.5793	1.00000	1.00000	1.00000	0.000		0.00	0.00	44.9617
28	SPH	24.5830	1.3652	1.74969	1.77469	1.74729	755.276	SF4	0.00	0.00	39.3824
29	SPH	-31.1330	.0307	1.00000	1.00000	1.00000	0.000		0.00	0.00	38.0172
30	SPH	13.4336	1.8839	1.74969	1.77469	1.74729	755.276	SF4	0.00	0.00	37.9865
31	SPH	10.4469	13.8798	1.00000	1.00000	1.00000	0.000		0.00	0.00	36.1026
32	CYL	3.6547	.6500	1.63269	1.64909	1.63108	636.353	F6	0.00	0.00	22.2228
33	CYL	-6.4870	.2149	1.00000	1.00000	1.00000	0.000		0.00	0.00	21.5728
34	CYL	-5.2748	.3500	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	21.3579
35	CYL	INFINITE	9.5469	1.00000	1.00000	1.00000	0.000		0.00	0.00	21.0079
36	CYL	INFINITE	.3500	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	11.4610
37	CYL	2.2357	.6000	1.63269	1.64909	1.63108	636.353	F6	0.00	0.00	11.1110
38	CYL	-2.1304	.2026	1.00000	1.00000	1.00000	0.000		0.00	0.00	10.5110
39	CYL	2.5833	.6000	1.63269	1.64909	1.63108	636.353	F6	0.00	0.00	10.3084
40	CYL	-3.2796	.3500	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	9.7084
41	CYL	INFINITE	2.3284	1.00000	1.00000	1.00000	0.000		0.00	0.00	9.3584
42	CYL	-1.7898	.3500	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	7.0300
43	CYL	-5.6466	.0200	1.00000	1.00000	1.00000	0.000		0.00	0.00	6.6800
44	CYL	INFINITE	.3500	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	6.6600
45	CYL	2.4613	.0200	1.00000	1.00000	1.00000	0.000		0.00	0.00	6.3100
46	CYL	.9311	.3500	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	6.2900
47	CYL	1.2905	3.3600	1.00000	1.00000	1.00000	0.000		0.00	0.00	5.9400
48	RTN	.0761	0.0000	1.00000	1.00000	1.00000	0.000		0.00	0.00	2.5800
49	CYL	INFINITE	.4000	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	2.5800
50	CYL	-1.2000	0.0000	1.00000	1.00000	1.00000	0.000		0.00	0.00	2.1800
51	RTN	-.0761	.5000	1.00000	1.00000	1.00000	0.000		0.00	0.00	2.1800
52	CYL	1.2000	.4000	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	1.6800
53	CYL	INFINITE	1.2800	1.00000	1.00000	1.00000	0.000		0.00	0.00	1.2800
54	SPH	INFINITE	-.0305	1.00000	1.00000	1.00000	0.000		0.00	0.00	-.0000

TABLE OF CONSTANTS

1	4.069600E+05	3.906200E-01	-4.557300E+03	1.106000E+02	0.000000E+00

FIRST ORDER PARAMETERS ON MERIDIONAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
-27.670022	999999.999996	999999.999996	999999.999996	372040.205900	182809.719947	1.210148
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
1.000000	999999.999996	41.609055	-20.445409	-40.196955	4547.819820	-.966063
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
-.966063	0.000000	131.981909	130.771761	-158.441783	.000303	-1.035130
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
0.000000	1.248489	19.000000	159.651930	1.932125	1.210148	53.000000

FIRST ORDER PARAMETERS ON EQUATORIAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
175.467238	999999.999996	198.391415	4.166255	-3.781136	.385119	1.310471
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
.025000	999999.999996	-53.171890	9.663495	11.809819	.078354	-.005553
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
-.222106	0.000000	132.082232	130.771761	44.695477	-.343805	-4.502346
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
0.000000	6.479563	35.000000	-43.385006	0.000000	2.109813	47.000000

Field point #0, $r_o - r_c = 0$

DESIGN NO.643256, JPL CORRELATOR, RANGE CURVATURE CORRECTOR, SHIFT AND AUXILIARY LENSES 103177- 0

FIELD POINT NO. 0 0.000000=H(Y) 0.000000=H(Z) 0.000000=G(Y) 1.000000=E(Y) 1.000000=E(Z)

-.022514=HPR(Y) 0.000000=HPR(Z) .012444=NA(Y) -.044719=NA(Z)

.6328=REFERENCE FOCUS WAVELENGTH .6328=RAY TRACING WAVELENGTH

400 RAYS THROUGH ENTRANCE PUPIL 400 RAYS THROUGH EXIT PUPIL 0 VIGNETTED RAYS

WAVE ABERRATION (WAVELENGTH UNITS)

-.00	-.12	-.18	-.19	-.17	-.14	-.10	-.05	-.03	-.01	-.01	-.03	-.05	-.10	-.14	-.17	-.19	-.18	-.12	-.00
-.02	-.13	-.18	-.19	-.17	-.13	-.09	-.05	-.02	-.00	-.00	-.02	-.05	-.09	-.13	-.17	-.19	-.18	-.13	-.02
-.03	-.14	-.19	-.19	-.17	-.13	-.09	-.04	-.01	.00	.00	-.01	-.04	-.09	-.13	-.17	-.19	-.19	-.14	-.03
-.03	-.14	-.19	-.20	-.17	-.13	-.08	-.04	-.01	.01	.01	-.01	-.04	-.08	-.13	-.17	-.20	-.19	-.14	-.03
-.04	-.15	-.20	-.20	-.18	-.13	-.09	-.04	-.01	.01	.01	-.01	-.04	-.09	-.13	-.18	-.20	-.20	-.15	-.04
-.05	-.16	-.20	-.20	-.18	-.14	-.09	-.04	-.01	.01	.01	-.01	-.04	-.09	-.14	-.18	-.20	-.20	-.16	-.05
-.06	-.17	-.21	-.21	-.18	-.14	-.09	-.05	-.01	.00	.00	-.01	-.05	-.09	-.14	-.18	-.21	-.21	-.17	-.06
-.06	-.17	-.21	-.21	-.18	-.14	-.09	-.05	-.02	.00	.00	-.02	-.05	-.09	-.14	-.18	-.21	-.21	-.17	-.06
-.07	-.17	-.21	-.21	-.19	-.14	-.09	-.05	-.02	-.00	-.00	-.02	-.05	-.09	-.14	-.19	-.21	-.21	-.17	-.07
-.06	-.17	-.21	-.22	-.19	-.14	-.10	-.05	-.02	-.00	-.00	-.02	-.05	-.10	-.14	-.19	-.22	-.21	-.17	-.06
-.06	-.16	-.21	-.21	-.18	-.14	-.09	-.05	-.02	-.00	-.00	-.02	-.05	-.09	-.14	-.18	-.21	-.21	-.16	-.06
-.05	-.16	-.21	-.21	-.18	-.14	-.09	-.05	-.02	-.00	-.00	-.02	-.05	-.09	-.14	-.18	-.21	-.21	-.16	-.05
-.03	-.15	-.19	-.20	-.17	-.13	-.09	-.04	-.01	.00	.00	-.01	-.04	-.09	-.13	-.17	-.20	-.19	-.15	-.03
-.02	-.12	-.18	-.18	-.16	-.12	-.08	-.04	-.00	.01	.01	-.00	-.04	-.08	-.12	-.16	-.18	-.18	-.12	-.02
.01	-.10	-.15	-.16	-.14	-.11	-.06	-.02	.01	.02	.02	.01	-.02	-.06	-.11	-.14	-.16	-.15	-.10	.01
.05	-.07	-.13	-.14	-.12	-.09	-.05	-.01	.02	.04	.04	.02	-.01	-.05	-.09	-.12	-.14	-.13	-.07	.05
.09	-.04	-.10	-.11	-.10	-.06	-.02	.01	.04	.06	.06	.04	.01	-.02	-.06	-.10	-.11	-.10	-.04	.09
.13	.01	-.06	-.08	-.06	-.03	.00	.04	.07	.08	.08	.07	.04	.00	-.03	-.06	-.08	-.06	.01	.13
.19	.06	-.01	-.03	-.02	.00	.04	.07	.10	.11	.11	.10	.07	.04	.00	-.02	-.03	-.01	.06	.19
.25	.11	.04	.01	.02	.04	.08	.11	.14	.15	.15	.14	.11	.08	.04	.02	.01	.04	.11	.25

ESIGN NO.643256, JPL CORRELATOR, RANGE CURVATURE CORRECTOR, SHIFT AND AUXILIARY LENSES 103177 0

FIELD POINT NO.0 .6328-MCR=REF.WVLTH .6328-MCR=WVF.WVLTH

RE-NORMALIZED LEGENDRE COEFFICIENTS

A(0,0)	A(0,1)	A(0,2)	A(0,3)	A(0,4)	A(0,5)	A(0,6)	A(0,7)	A(0,8)
0.000000	0.000000	-.019964	.000000	.069313	.000000	-.000211	.000000	0.000000

A(1,0)	A(1,1)	A(1,2)	A(1,3)	A(1,4)	A(1,5)	A(1,6)	A(1,7)
0.000000	-.000000	-.010060	-.000000	.000149	-.000000	.000048	0.000000

A(2,0)	A(2,1)	A(2,2)	A(2,3)	A(2,4)	A(2,5)	A(2,6)
.037630	-.000000	.012593	.000000	.000018	.000000	0.000000

A(3,0)	A(3,1)	A(3,2)	A(3,3)	A(3,4)	A(3,5)
-.013770	-.000000	.000284	-.000000	.000124	0.000000

A(4,0)	A(4,1)	A(4,2)	A(4,3)	A(4,4)
.000006	.000000	-.000110	.000000	0.000000

A(5,0)	A(5,1)	A(5,2)	A(5,3)
.000094	.000000	.000089	0.000000

A(6,0)	A(6,1)	A(6,2)
.000042	-.000000	0.000000

A(7,0)	A(7,1)
-.000024	0.000000

A(8,0)
0.000000

.084074=RMS WAVE DEFORMATION

Field point #1, $r_o - r_c = 1.0$

DESIGN NO.64325G, JPL CORRELATOR, RANGE CURVATURE CORRECTOR, SHIFT AND AUXILIARY LENSES 103177- 0

FIELD POINT NO. 1 1.000000=H(Y) 0.000000=H(Z) 0.000000=G(Y) 1.000000=E(Y) 1.014919=E(Z)

-.988130=HPR(Y) 0.000000=HPR(Z) .012446=NA(Y) -.045072=NA(Z)

.6328=REFERENCE FOCUS WAVELENGTH .6328=RAY TRACING WAVELENGTH

400 RAYS THROUGH ENTRANCE PUPIL 400 RAYS THROUGH EXIT PUPIL 0 VIGNETTED RAYS

WAVE ABERRATION (WAVELENGTH UNITS)

-.17	-.30	-.37	-.39	-.38	-.35	-.31	-.28	-.25	-.24	-.24	-.25	-.28	-.31	-.35	-.38	-.39	-.37	-.30	-.17
-.13	-.26	-.32	-.34	-.33	-.30	-.26	-.22	-.20	-.18	-.18	-.20	-.22	-.26	-.30	-.33	-.34	-.32	-.26	-.13
-.10	-.22	-.29	-.30	-.29	-.26	-.22	-.18	-.15	-.14	-.14	-.15	-.18	-.22	-.26	-.29	-.30	-.29	-.22	-.10
-.08	-.19	-.25	-.27	-.25	-.22	-.18	-.14	-.11	-.10	-.10	-.11	-.14	-.18	-.22	-.25	-.27	-.25	-.19	-.08
-.05	-.17	-.23	-.24	-.23	-.19	-.15	-.11	-.08	-.07	-.07	-.08	-.11	-.15	-.19	-.23	-.24	-.23	-.17	-.05
-.03	-.15	-.20	-.22	-.20	-.17	-.13	-.09	-.06	-.04	-.04	-.06	-.09	-.13	-.17	-.20	-.22	-.20	-.15	-.03
-.01	-.13	-.19	-.20	-.19	-.15	-.11	-.07	-.04	-.03	-.03	-.04	-.07	-.11	-.15	-.19	-.20	-.19	-.13	-.01
-.00	-.12	-.18	-.19	-.17	-.14	-.10	-.06	-.03	-.01	-.01	-.03	-.06	-.10	-.14	-.17	-.19	-.18	-.12	-.00
.01	-.11	-.17	-.18	-.16	-.13	-.09	-.05	-.02	-.01	-.01	-.02	-.05	-.09	-.13	-.16	-.18	-.17	-.11	.01
.03	-.10	-.16	-.18	-.16	-.13	-.09	-.05	-.02	-.00	-.00	-.02	-.05	-.09	-.13	-.16	-.18	-.16	-.10	.03
.03	-.09	-.15	-.17	-.16	-.12	-.08	-.05	-.02	-.00	-.00	-.02	-.05	-.08	-.12	-.16	-.17	-.15	-.09	.03
.04	-.09	-.15	-.17	-.16	-.12	-.09	-.05	-.02	-.01	-.01	-.02	-.05	-.09	-.12	-.16	-.17	-.15	-.09	.04
.05	-.08	-.15	-.17	-.16	-.13	-.09	-.05	-.03	-.01	-.01	-.03	-.05	-.09	-.13	-.16	-.17	-.15	-.08	.05
.06	-.07	-.15	-.17	-.16	-.13	-.10	-.06	-.03	-.02	-.02	-.03	-.06	-.10	-.13	-.16	-.17	-.15	-.07	.06
.07	-.07	-.14	-.17	-.16	-.14	-.10	-.07	-.04	-.03	-.03	-.04	-.07	-.10	-.14	-.16	-.17	-.14	-.07	.07
.08	-.06	-.14	-.17	-.16	-.14	-.11	-.08	-.05	-.04	-.04	-.05	-.08	-.11	-.14	-.16	-.17	-.14	-.06	.08
.09	-.05	-.14	-.17	-.17	-.14	-.11	-.08	-.06	-.05	-.05	-.06	-.08	-.11	-.14	-.17	-.17	-.14	-.05	.09
.11	-.04	-.13	-.17	-.17	-.15	-.12	-.09	-.07	-.05	-.05	-.07	-.09	-.12	-.15	-.17	-.17	-.13	-.04	.11
.13	-.02	-.12	-.16	-.17	-.15	-.12	-.10	-.08	-.06	-.06	-.08	-.10	-.12	-.15	-.17	-.16	-.12	-.02	.13
.16	-.01	-.10	-.15	-.16	-.15	-.13	-.10	-.08	-.07	-.07	-.08	-.10	-.13	-.15	-.16	-.15	-.10	-.01	.16

DESIGN NO.64325G, JPL CORRELATOR, RANGE CURVATURE CORRECTOR, SHIFT AND AUXILIARY LENSES 103177

FIELD POINT NO.1 .6328-MCR=REF.WVLTH .6328-MCR=WVF.WVLTH

RE-NORMALIZED LEGENDRE COEFFICIENTS

A(0,0)	A(0,1)	A(0,2)	A(0,3)	A(0,4)	A(0,5)	A(0,6)	A(0,7)	A(0,8)
0.000000	0.000000	.009609	.000000	.069871	.000000	-.000372	.000000	0.000000

A(1,0)	A(1,1)	A(1,2)	A(1,3)	A(1,4)	A(1,5)	A(1,6)	A(1,7)
0.000000	.000000	-.016271	.000000	-.000591	.000000	.000067	0.000000

A(2,0)	A(2,1)	A(2,2)	A(2,3)	A(2,4)	A(2,5)	A(2,6)
-.035815	-.000000	.012508	.000000	.000120	.000000	0.000000

A(3,0)	A(3,1)	A(3,2)	A(3,3)	A(3,4)	A(3,5)
-.014691	.000000	.000426	.000000	.000272	0.000000

A(4,0)	A(4,1)	A(4,2)	A(4,3)	A(4,4)
-.000083	-.000000	.000238	-.000000	0.000000

A(5,0)	A(5,1)	A(5,2)	A(5,3)
-.000149	.000000	-.000019	0.000000

A(6,0)	A(6,1)	A(6,2)
.000034	-.000000	0.000000

A(7,0)	A(7,1)
-.000016	0.000000

A(8,0)
0.000000

.083035=RMS WAVE DEFORMATION

Field point #2, $r_o - r_c = -1.0$

DESIGN NO.64325G, JPL CORRELATOR, RANGE CURVATURE CORRECTOR, SHIFT AND AUXILIARY LENSES 103177- 0

FIELD POINT NO. 2 -1.000000=H(Y) 0.000000=H(Z) 0.000000=G(Y) 1.000000=E(Y) .985081=E(Z)

.943092=HPR(Y) 0.000000=HPR(Z) .012446=NA(Y) -.044782=NA(Z)

.6328=REFERENCE FOCUS WAVELENGTH .6328=RAY TRACING WAVELENGTH

400 RAYS THROUGH ENTRANCE PUPIL 400 RAYS THROUGH EXIT PUPIL 0 VIGNETTED RAYS

WAVE ABERRATION (WAVELENGTH UNITS)

.19	.02	-.08	-.13	-.15	-.14	-.12	-.10	-.08	-.07	-.07	-.08	-.10	-.12	-.14	-.15	-.13	-.08	.02	.19
.20	.02	-.07	-.12	-.13	-.12	-.10	-.08	-.06	-.05	-.05	-.06	-.08	-.10	-.12	-.13	-.12	-.07	.02	.20
.19	.02	-.07	-.12	-.13	-.11	-.09	-.07	-.05	-.03	-.03	-.05	-.07	-.09	-.11	-.13	-.12	-.07	.02	.19
.19	.03	-.07	-.11	-.12	-.11	-.08	-.05	-.04	-.02	-.02	-.04	-.05	-.08	-.11	-.12	-.11	-.07	.03	.19
.18	.02	-.07	-.11	-.11	-.10	-.07	-.05	-.03	-.02	-.02	-.03	-.05	-.07	-.10	-.11	-.11	-.07	.02	.18
.18	.02	-.07	-.11	-.11	-.10	-.07	-.04	-.02	-.01	-.01	-.02	-.04	-.07	-.10	-.11	-.11	-.07	.02	.18
.17	.02	-.07	-.11	-.11	-.09	-.07	-.04	-.02	-.01	-.01	-.02	-.04	-.07	-.09	-.11	-.11	-.07	.02	.17
.17	.02	-.07	-.11	-.11	-.09	-.07	-.04	-.02	-.01	-.01	-.02	-.04	-.07	-.09	-.11	-.11	-.07	.02	.17
.17	.02	-.07	-.10	-.11	-.09	-.06	-.04	-.01	-.00	-.00	-.01	-.04	-.06	-.09	-.11	-.10	-.07	.02	.17
.18	.02	-.07	-.10	-.11	-.09	-.06	-.04	-.01	-.00	-.00	-.01	-.04	-.06	-.09	-.11	-.10	-.07	.02	.18
.18	.03	-.06	-.10	-.11	-.09	-.06	-.03	-.01	-.00	-.00	-.01	-.03	-.06	-.09	-.11	-.10	-.06	.03	.18
.18	.02	-.06	-.10	-.10	-.09	-.06	-.03	-.01	.00	.00	-.01	-.03	-.06	-.09	-.10	-.10	-.06	.02	.18
.19	.04	-.05	-.09	-.10	-.08	-.06	-.03	-.01	.00	.00	-.01	-.03	-.06	-.08	-.10	-.09	-.05	.04	.19
.21	.05	-.04	-.08	-.09	-.07	-.05	-.02	-.00	.01	.01	-.00	-.02	-.05	-.07	-.09	-.08	-.04	.05	.21
.23	.07	-.02	-.06	-.08	-.06	-.04	-.02	.00	.01	.01	.00	-.02	-.04	-.06	-.08	-.06	-.02	.07	.23
.26	.09	-.00	-.05	-.06	-.05	-.03	-.00	.01	.03	.03	.01	-.00	-.03	-.05	-.06	-.05	-.00	.09	.26
.28	.12	.02	-.03	-.04	-.03	-.02	.01	.03	.04	.04	.03	.01	-.02	-.03	-.04	-.03	.02	.12	.28
.32	.15	.05	-.00	-.02	-.01	.00	.03	.04	.05	.05	.04	.03	.00	-.01	-.02	-.00	.05	.15	.32
.37	.19	.09	.03	.01	.02	.03	.05	.07	.08	.08	.07	.05	.03	.02	.01	.03	.09	.19	.37
.43	.24	.13	.07	.05	.05	.06	.08	.09	.10	.10	.09	.08	.06	.05	.05	.07	.13	.24	.43

DESIGN NO.64325G, JPL CORRELATOR, RANGE CURVATURE CORRECTOR, SHIFT AND AUXILIARY LENSES 103177 0

FIELD POINT NO.2 .6328-MCR=REF.WVLTH .6328-MCR=WVF.WVLTH

RE-NORMALIZED LEGENDRE COEFFICIENTS

A(0,0)	A(0,1)	A(0,2)	A(0,3)	A(0,4)	A(0,5)	A(0,6)	A(0,7)	A(0,8)
0.000000	0.000000	.058083	.000000	.069459	.000000	-.000007	.000000	0.000000

A(1,0)	A(1,1)	A(1,2)	A(1,3)	A(1,4)	A(1,5)	A(1,6)	A(1,7)
0.000000	-.000000	-.005737	-.000000	.000604	.000000	.000004	0.000000

A(2,0)	A(2,1)	A(2,2)	A(2,3)	A(2,4)	A(2,5)	A(2,6)
.020051	.000000	.012819	.000000	.000122	.000000	0.000000

A(3,0)	A(3,1)	A(3,2)	A(3,3)	A(3,4)	A(3,5)
-.013683	.000000	-.000009	.000000	-.000096	0.000000

A(4,0)	A(4,1)	A(4,2)	A(4,3)	A(4,4)
.000205	-.000000	.000026	-.000000	0.000000

A(5,0)	A(5,1)	A(5,2)	A(5,3)
.000014	-.000000	.000019	0.000000

A(6,0)	A(6,1)	A(6,2)
-.000067	.000000	0.000000

A(7,0)	A(7,1)
-.000031	0.000000

A(8,0)
0.000000

.094789=RMS WAVE DEFORMATION

Phase I

DESIGN NO.64325IX, JPL CORRELATOR, RCC, SHIFT LENS, DUMMY AZIMUTH TELESCOPE. 032377-347

2 -2 1 .332500=PM(1) 0.000000=SIN UM(1) 1.000000=HP(1) 0.000000=TAN UP(1)
2 -2 1 1.650000=PM(2) 0.000000=SIN UM(2) 0.000000=HP(2) 0.000000=TAN UP(2)

25.4MM=UNIT OF LENGTH

		RADIUS,ETC	AXL.DSTNCE	.63280 M-INDEX	.48610 L-INDEX	.65630 U-INDEX	GLASS CODE,NAME	1ST.CA	2ND.CA	STATION
			0.0000	1.00000	1.00000	1.00000		0.00	0.00	130.7153
1	RTN	-.0053	0.0000	1.00000	1.00000	1.00000	0.000	0.00	0.00	130.7153
2	TRN	-5.4900	0.0000	1.00000	1.00000	1.00000	0.000	0.00	0.00	130.7153
3	RPH	********* .0000	0.0000	1.00000	1.00000	1.00000	-.056 XXXXXX	0.00	0.00	130.7153
4	TRN	5.4900	18.0000	1.00000	1.00000	1.00000	0.000	0.00	0.00	130.7153
5	SPH	-10.4469	1.8839	1.74969	1.77469	1.74729	755.276 SF4	0.00	0.00	112.7153
6	SPH	-13.4336	.0307	1.00000	1.00000	1.00000	0.000	0.00	0.00	110.8314
7	SPH	31.1330	1.3652	1.74969	1.77469	1.74729	755.276 SF4	0.00	0.00	110.8007
8	SPH	-24.5830	5.5793	1.00000	1.00000	1.00000	0.000	0.00	0.00	109.4355
9	SPH	-14.9126	1.3477	1.50671	1.51423	1.50592	508.612 ZKN7	0.00	0.00	103.8562
10	SPH	15.8548	3.6306	1.00000	1.00000	1.00000	0.000	0.00	0.00	102.5085
11	SPH	24.5464	1.3652	1.74969	1.77469	1.74729	755.276 SF4	0.00	0.00	98.8779
12	SPH	-34.5304	3.5303	1.00000	1.00000	1.00000	0.000	0.00	0.00	97.5127
13	SPH	13.1420	1.8553	1.74969	1.77469	1.74729	755.276 SF4	0.00	0.00	93.9824
14	SPH	10.5330	16.0000	1.00000	1.00000	1.00000	0.000	0.00	0.00	92.1271
15	RTN	-.0587	-.1653	1.00000	1.00000	1.00000	0.000	0.00	0.00	76.1271
16	SPH	-6.6582	.3305	1.79883	1.82776	1.79609	805.254 SF6	0.00	0.00	76.2923
17	CYL	-6.6582	-.1653	1.00000	1.00000	1.00000	0.000	0.00	0.00	75.9618
18	RTN	.0587	1.2919	1.00000	1.00000	1.00000	0.000	0.00	0.00	76.1271
19	RTN	.0587	-.1630	1.00000	1.00000	1.00000	0.000	0.00	0.00	74.8352
20	CYL	-7.3958	.3260	1.79883	1.82776	1.79609	805.254 SF6	0.00	0.00	74.9982
21	SPH	-7.7230	-.1630	1.00000	1.00000	1.00000	0.000	0.00	0.00	74.6722
22	RTN	-.0587	1.2522	1.00000	1.00000	1.00000	0.000	0.00	0.00	74.8352
23	RTN	-.0223	0.0000	1.00000	1.00000	1.00000	0.000	0.00	0.00	73.5830

24	CYL	5.6253	.2500	1.79883	1.8[illegible]6	1.79609	805.254	SF6	0.00	0.00	73.5830
25	SPH	30.3365	0.0000	1.00000	1.00000	1.00000	0.000		0.00	0.00	73.3330
26	RTN	.0223	17.9790	1.00000	1.00000	1.00000	0.000		0.00	0.00	73.3330
27	SPH	-10.5330	1.8553	1.74969	1.77469	1.74729	755.276	SF4	0.00	0.00	55.3540
28	SPH	-13.1420	3.5303	1.00000	1.00000	1.00000	0.000		0.00	0.00	53.4987
29	SPH	34.5304	1.3652	1.74969	1.77469	1.74729	755.276	SF4	0.00	0.00	49.9684
30	SPH	-24.5464	3.6303	1.00000	1.00000	1.00000	0.000		0.00	0.00	48.6032
31	SPH	-15.8548	1.3477	1.50671	1.51423	1.50592	508.612	ZKN7	0.00	0.00	44.9729
32	SPH	14.9126	5.5793	1.00000	1.00000	1.00000	0.000		0.00	0.00	43.6252
33	SPH	24.5830	1.3652	1.74969	1.77469	1.74729	755.276	SF4	0.00	0.00	38.0459
34	SPH	-31.1330	.0307	1.00000	1.00000	1.00000	0.000		0.00	0.00	36.6807
35	SPH	13.4336	1.8839	1.74969	1.77469	1.74729	755.276	SF4	0.00	0.00	36.6500
36	SPH	10.4469	17.2604	1.00000	1.00000	1.00000	0.000		0.00	0.00	34.7661
37	CYL	4.7640	.6500	1.75759	1.77722	1.75566	.028	XXXXXX	0.00	0.00	17.5057
38	CYL	-4.4429	0.0000	1.00000	1.00000	1.00000	0.000		0.00	0.00	16.8557
39	CYL	-3.6353	0.0000	1.61868	1.63477	1.61711	.029	XXXXXX	0.00	0.00	16.8557
40	CYL	28.9670	8.3670	1.00000	1.00000	1.00000	0.000		0.00	0.00	16.8557
41	CYL	3.3555	.1750	1.79583	1.82462	1.79308	.040	XXXXXX	0.00	0.00	8.4886
42	CYL	-2.1443	5.7336	1.00000	1.00000	1.00000	0.000		0.00	0.00	8.3136
43	RTN	.0761	0.0000	1.00000	1.00000	1.00000	0.000		0.00	0.00	2.5800
44	CYL	INFINITE	.4000	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	2.5800
45	CYL	-1.2000	0.0000	1.00000	1.00000	1.00000	0.000		0.00	0.00	2.1800
46	RTN	-.0761	.5000	1.00000	1.00000	1.00000	0.000		0.00	0.00	2.1800
47	CYL	1.2000	.4000	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	1.6800
48	CYL	INFINITE	1.2800	1.00000	1.00000	1.00000	0.000		0.00	0.00	1.2800
49	SPH	INFINITE	-.0226	1.00000	1.00000	1.00000	0.000		0.00	0.00	-.0000

TABLE OF CONSTANTS

3	4.069600E+05	3.906200E-01	-4.557300E+03	1.106000E+02	6.563200E+03

FIRST ORDER PARAMETERS ON MERIDIONAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
-27.670022	999999.999996	999999.999996	999999.999996	372250.382545	182913.015351	1.254943
OBJECT HEIGHT	**ENTR.PUP.SIZE**	**OBJT.SPCE.FNO**	**INF.EQUIV.FNO**	**IMGE.SPCE.FNO**	**EXT.PUPL.SIZE**	**IMAGE HEIGHT**
1.000000	999999.999996	41.609055	-20.445409	-40.196955	4550.388522	-.966063

-.966063	0.000000	130.690195	129.435252	-157.105274	.000303	-1.035130
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
0.000000	1.248490	22.000000	158.360217	1.932125	1.254943	48.000000

FIRST ORDER PARAMETERS ON EQUATORIAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
175.467238	999999.999996	0.000000	0.000000	0.000000	999999.999996	1.302600
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
0.000000	999999.999996	-53.171890	9.582985	11.689796	999999.999996	0.000000
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
-.219849	0.000000	130.737852	129.435252	46.031986	0.000000	-4.548573
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
0.000000	0.000000	0.000000	-44.729386	0.000000	4.476031	42.000000

Field point #0, $r_o - r_c = 0$

DESIGN NO.64325IX, JPL CORRELATOR, RCC, SHIFT LENS, DUMMY AZIMUTH TELESCOPE. 032377-347

FIELD POINT NO. 0 0.000000=H(Y) 0.000000=H(Z) 0.000000=G(Y) 1.000000=E(Y) 1.000000=E(Z)

-.073927=HPR(Y) -.000042=HPR(Z) .012496=NA(Y) -.044519=NA(Z)

.6328=REFERENCE FOCUS WAVELENGTH .6328=RAY TRACING WAVELENGTH

400 RAYS THROUGH ENTRANCE PUPIL 400 RAYS THROUGH EXIT PUPIL 0 VIGNETTED RAYS

WAVE ABERRATION (WAVELENGTH UNITS)

.13 -.07 -.19 -.24 -.24 -.21 -.17 -.13 -.10 -.09 -.10 -.13 -.17 -.23 -.29 -.34 -.37 -.37 -.31 -.17

.14 -.06 -.18 -.22 -.22 -.19 -.15 -.11 -.08 -.07 -.07 -.10 -.14 -.20 -.26 -.31 -.34 -.33 -.27 -.13

.15 -.05 -.17 -.21 -.21 -.18 -.14 -.09 -.06 -.05 -.05 -.08 -.12 -.17 -.23 -.28 -.32 -.31 -.24 -.11

.16 -.04 -.16 -.20 -.20 -.17 -.12 -.08 -.05 -.03 -.04 -.06 -.10 -.16 -.21 -.26 -.30 -.29 -.22 -.08

.16 -.04 -.15 -.19 -.19 -.16 -.11 -.07 -.04 -.02 -.02 -.05 -.09 -.14 -.20 -.25 -.28 -.27 -.21 -.07

.16 -.04 -.15 -.19 -.19 -.15 -.11 -.06 -.03 -.01 -.01 -.04 -.08 -.13 -.19 -.24 -.26 -.25 -.19 -.05

.16 -.04 -.15 -.19 -.18 -.15 -.10 -.06 -.03 -.01 -.01 -.03 -.07 -.12 -.18 -.23 -.25 -.24 -.17 -.04

.16 -.04 -.15 -.19 -.18 -.15 -.10 -.06 -.02 -.00 -.00 -.03 -.07 -.12 -.17 -.22 -.24 -.24 -.17 -.03

.17 -.04 -.14 -.19 -.18 -.15 -.10 -.06 -.02 -.00 -.00 -.02 -.06 -.11 -.17 -.22 -.24 -.23 -.16 -.02

.16 -.03 -.14 -.18 -.18 -.15 -.10 -.06 -.02 -.00 -.00 -.02 -.06 -.11 -.16 -.21 -.24 -.22 -.16 -.01

.17 -.03 -.14 -.18 -.18 -.15 -.10 -.06 -.02 -.00 -.00 -.02 -.06 -.11 -.16 -.21 -.24 -.22 -.16 -.01

.18 -.02 -.13 -.17 -.17 -.14 -.10 -.06 -.02 -.00 -.00 -.02 -.06 -.11 -.16 -.21 -.23 -.22 -.15 -.01

.19 -.00 -.12 -.17 -.17 -.14 -.10 -.05 -.02 -.00 -.00 -.02 -.06 -.11 -.16 -.21 -.23 -.22 -.15 -.00

.21 .00 -.11 -.16 -.16 -.13 -.09 -.05 -.01 .00 .00 -.02 -.06 -.11 -.16 -.21 -.23 -.22 -.15 .00

.23 .03 -.09 -.14 -.15 -.12 -.08 -.04 -.01 .01 .01 -.01 -.05 -.10 -.16 -.20 -.23 -.22 -.14 .00

.26 .05 -.07 -.12 -.13 -.11 -.07 -.03 .00 .02 .02 -.01 -.04 -.09 -.15 -.19 -.22 -.21 -.14 .01

.29 .08 -.04 -.10 -.11 -.09 -.05 -.01 .02 .03 .03 .01 -.03 -.08 -.14 -.18 -.21 -.20 -.13 .02

.33 .12 -.01 -.07 -.08 -.06 -.03 .01 .03 .05 .04 .02 -.02 -.07 -.12 -.17 -.20 -.19 -.12 .02

.38 .16 .03 -.03 -.05 -.03 -.00 .03 .06 .07 .06 .04 -.00 -.05 -.11 -.16 -.18 -.17 -.10 .05

ESIGN NO.6432SIX, JPL CORRELATOR, RCC, SHIFT LENS, DUMMY AZIMUTH TELESCOPE. 032377 347

FIELD POINT NO.0 .6328-MCR=REF.WVLTH .6328-MCR=WVF.WVLTH

RE-NORMALIZED LEGENDRE COEFFICIENTS

A(0,0)	A(0,1)	A(0,2)	A(0,3)	A(0,4)	A(0,5)	A(0,6)	A(0,7)	A(0,8)
0.000000	0.000000	.011533	-.016490	.091987	-.000499	-.001422	.000179	0.000000

A(1,0)	A(1,1)	A(1,2)	A(1,3)	A(1,4)	A(1,5)	A(1,6)	A(1,7)
0.000000	.000576	-.007612	.000990	.000500	-.000608	.000005	0.000000

A(2,0)	A(2,1)	A(2,2)	A(2,3)	A(2,4)	A(2,5)	A(2,6)
.000139	-.013614	.003558	-.000431	-.000142	.000015	0.000000

A(3,0)	A(3,1)	A(3,2)	A(3,3)	A(3,4)	A(3,5)
-.014072	.000942	.000068	.000101	.000029	0.000000

A(4,0)	A(4,1)	A(4,2)	A(4,3)	A(4,4)
.000022	-.000038	-.000073	-.000045	0.000000

A(5,0)	A(5,1)	A(5,2)	A(5,3)
.000008	-.000086	.000074	0.000000

A(6,0)	A(6,1)	A(6,2)
.000002	-.000020	0.000000

A(7,0)	A(7,1)
.000009	0.000000

A(8,0)
0.000000

.096570=RMS WAVE DEFORMATION

Field point #1, $r_o - r_c = 1.0$

DESIGN NO.64325IX, JPL CORRELATOR, RCC, SHIFT LENS, DUMMY AZIMUTH TELESCOPE. 032377-347

FIELD POINT NO. 1 1.000000=H(Y) 0.000000=H(Z) 0.000000=G(Y) 1.000000=E(Y) 1.014919=E(Z)

-1.040223=HPR(Y) -.010695=HPR(Z) .012502=NA(Y) -.044451=NA(Z)

.6328=REFERENCE FOCUS WAVELENGTH .6328=RAY TRACING WAVELENGTH

400 RAYS THROUGH ENTRANCE PUPIL 400 RAYS THROUGH EXIT PUPIL 0 VIGNETTED RAYS

WAVE ABERRATION (WAVELENGTH UNITS)

.19	-.12	-.32	-.42	-.47	-.47	-.43	-.39	-.36	-.33	-.32	-.34	-.38	-.43	-.49	-.57	-.63	-.70	-.74	-.76
.27	-.05	-.24	-.35	-.39	-.39	-.36	-.32	-.28	-.26	-.25	-.27	-.30	-.36	-.42	-.49	-.56	-.62	-.66	-.67
.35	.03	-.18	-.28	-.33	-.32	-.29	-.26	-.22	-.20	-.19	-.20	-.24	-.29	-.36	-.43	-.50	-.56	-.60	-.61
.40	.08	-.12	-.23	-.27	-.27	-.24	-.20	-.17	-.14	-.14	-.15	-.19	-.24	-.31	-.38	-.45	-.51	-.55	-.56
.46	.14	-.06	-.18	-.22	-.22	-.19	-.16	-.12	-.10	-.10	-.11	-.15	-.20	-.26	-.34	-.41	-.47	-.50	-.51
.51	.18	-.02	-.13	-.18	-.18	-.15	-.12	-.09	-.07	-.06	-.08	-.11	-.17	-.23	-.30	-.37	-.43	-.47	-.48
.55	.22	.01	-.10	-.15	-.15	-.13	-.09	-.06	-.04	-.04	-.05	-.09	-.14	-.21	-.28	-.35	-.41	-.45	-.45
.59	.26	.05	-.07	-.12	-.13	-.10	-.07	-.04	-.02	-.02	-.04	-.07	-.13	-.19	-.27	-.33	-.39	-.42	-.43
.62	.29	.07	-.05	-.10	-.11	-.09	-.06	-.03	-.01	-.01	-.03	-.06	-.12	-.19	-.26	-.32	-.38	-.42	-.42
.65	.31	.09	-.03	-.09	-.10	-.08	-.05	-.02	-.00	-.00	-.02	-.06	-.11	-.18	-.25	-.32	-.38	-.41	-.41
.67	.33	.11	-.02	-.08	-.09	-.07	-.04	-.02	-.00	-.00	-.02	-.06	-.12	-.19	-.26	-.33	-.38	-.42	-.41
.69	.34	.12	-.01	-.07	-.08	-.07	-.05	-.02	-.01	-.01	-.03	-.07	-.13	-.20	-.27	-.34	-.39	-.42	-.42
.71	.36	.13	-.00	-.07	-.08	-.07	-.05	-.03	-.02	-.02	-.04	-.09	-.14	-.21	-.28	-.35	-.41	-.44	-.44
.72	.37	.14	.00	-.07	-.09	-.08	-.06	-.04	-.03	-.03	-.06	-.10	-.16	-.23	-.30	-.37	-.43	-.46	-.46
.74	.38	.15	.00	-.07	-.09	-.09	-.07	-.05	-.05	-.05	-.08	-.12	-.18	-.25	-.33	-.40	-.45	-.48	-.48
.75	.39	.15	.00	-.07	-.10	-.10	-.08	-.07	-.06	-.07	-.10	-.15	-.21	-.28	-.35	-.42	-.48	-.51	-.50
.77	.40	.16	.00	-.08	-.11	-.11	-.10	-.09	-.09	-.10	-.13	-.17	-.23	-.31	-.38	-.45	-.51	-.54	-.54
.79	.41	.16	.00	-.08	-.12	-.12	-.12	-.11	-.11	-.12	-.15	-.20	-.27	-.34	-.41	-.49	-.54	-.57	-.56
.81	.43	.17	.00	-.09	-.13	-.14	-.13	-.13	-.13	-.15	-.18	-.23	-.30	-.37	-.45	-.52	-.58	-.61	-.60
.82	.44	.17	.01	-.09	-.13	-.15	-.15	-.15	-.15	-.17	-.21	-.26	-.33	-.40	-.49	-.56	-.62	-.65	-.64

DESIGN NO.64325IX, JPL CORRELATOR, RCC, SHIFT LENS, DUMMY AZIMUTH TELESCOPE. 032377 347

FIELD POINT NO.1 .6328-MCR=REF.WVLTH .6328-MCR=WVF.WVLTH

RE-NORMALIZED LEGENDRE COEFFICIENTS

A(0,0)	A(0,1)	A(0,2)	A(0,3)	A(0,4)	A(0,5)	A(0,6)	A(0,7)	A(0,8)
0.000000	0.000000	.027644	-.099366	.086085	-.005494	-.002560	.001053	0.000000

A(1,0)	A(1,1)	A(1,2)	A(1,3)	A(1,4)	A(1,5)	A(1,6)	A(1,7)
0.000000	.046625	-.023654	.000271	-.000683	-.000865	.000016	0.000000

A(2,0)	A(2,1)	A(2,2)	A(2,3)	A(2,4)	A(2,5)	A(2,6)
-.076844	-.012895	.003011	-.000430	-.000123	.000005	0.000000

A(3,0)	A(3,1)	A(3,2)	A(3,3)	A(3,4)	A(3,5)
-.015092	.000944	.000082	-.000064	-.000037	0.000000

A(4,0)	A(4,1)	A(4,2)	A(4,3)	A(4,4)
-.000164	-.000001	-.000100	.000049	0.000000

A(5,0)	A(5,1)	A(5,2)	A(5,3)
.000022	-.000127	.000257	0.000000

A(6,0)	A(6,1)	A(6,2)
-.000170	-.000114	0.000000

A(7,0)	A(7,1)
.000055	0.000000

A(8,0)
0.000000

.164309=RMS WAVE DEFORMATION

Field point #2, $r_6 - r_c = -1.0$

DESIGN NO.64325IX, JPL CORRELATOR, RCC, SHIFT LENS, DUMMY AZIMUTH TELESCOPE. 032377-347

ELD POINT NO. 2 -1.000000=H(Y) 0.000000=H(Z) 0.000000=G(Y) 1.000000=E(Y) .985081=E(Z)

.892189=HPR(Y) .010595=HPR(Z) .012492=NA(Y) -.044727=NA(Z)

.6328=REFERENCE FOCUS WAVELENGTH .6328=RAY TRACING WAVELENGTH

400 RAYS THROUGH ENTRANCE PUPIL 400 RAYS THROUGH EXIT PUPIL 0 VIGNETTED RAYS

WAVE ABERRATION (WAVELENGTH UNITS)

.12 -.05 -.14 -.19 -.19 -.18 -.16 -.13 -.13 -.13 -.15 -.18 -.22 -.27 -.30 -.31 -.27 -.16 .04 .37

.13 -.04 -.13 -.17 -.18 -.16 -.13 -.11 -.10 -.10 -.11 -.15 -.18 -.23 -.26 -.26 -.22 -.11 .09 .42

.12 -.04 -.13 -.17 -.16 -.15 -.11 -.09 -.07 -.07 -.08 -.11 -.15 -.19 -.22 -.23 -.18 -.07 .13 .46

.12 -.04 -.13 -.16 -.16 -.13 -.10 -.07 -.05 -.05 -.06 -.09 -.12 -.16 -.19 -.19 -.15 -.04 .17 .50

.11 -.05 -.13 -.16 -.15 -.13 -.09 -.06 -.04 -.03 -.04 -.07 -.10 -.14 -.16 -.16 -.12 -.01 .19 .53

.10 -.05 -.13 -.16 -.15 -.12 -.09 -.05 -.03 -.02 -.03 -.05 -.08 -.12 -.14 -.14 -.10 .02 .22 .56

.09 -.06 -.14 -.16 -.15 -.12 -.08 -.05 -.02 -.01 -.02 -.04 -.07 -.10 -.12 -.12 -.07 .04 .25 .58

.08 -.07 -.15 -.17 -.16 -.12 -.08 -.05 -.02 -.01 -.01 -.03 -.06 -.09 -.11 -.11 -.06 .05 .26 .60

.06 -.08 -.16 -.18 -.16 -.13 -.09 -.05 -.02 -.00 -.01 -.02 -.05 -.08 -.10 -.09 -.05 .07 .28 .61

.05 -.10 -.17 -.19 -.17 -.13 -.09 -.05 -.02 -.00 -.00 -.02 -.04 -.07 -.09 -.08 -.03 .08 .29 .62

.04 -.10 -.17 -.19 -.17 -.14 -.09 -.05 -.02 -.00 -.00 -.02 -.04 -.07 -.08 -.07 -.03 .09 .30 .63

.03 -.11 -.18 -.20 -.18 -.14 -.10 -.06 -.02 -.00 -.00 -.01 -.04 -.06 -.08 -.07 -.02 .10 .31 .64

.02 -.12 -.19 -.20 -.19 -.15 -.10 -.06 -.02 -.00 -.00 -.01 -.04 -.06 -.07 -.07 -.01 .11 .31 .65

.01 -.13 -.19 -.21 -.19 -.15 -.10 -.06 -.03 -.01 -.00 -.01 -.03 -.06 -.07 -.06 -.01 .11 .32 .65

.01 -.13 -.19 -.21 -.19 -.15 -.11 -.06 -.03 -.01 -.00 -.01 -.03 -.05 -.07 -.05 -.00 .12 .33 .66

.01 -.12 -.19 -.21 -.19 -.15 -.11 -.06 -.03 -.00 -.00 -.01 -.03 -.05 -.06 -.05 .00 .13 .34 .66

.01 -.12 -.19 -.21 -.19 -.15 -.10 -.06 -.02 -.00 .00 -.01 -.02 -.04 -.05 -.04 .01 .13 .34 .67

.03 -.11 -.18 -.20 -.18 -.14 -.10 -.05 -.02 .00 .01 .00 -.01 -.03 -.05 -.03 .02 .14 .35 .68

.04 -.10 -.17 -.19 -.17 -.13 -.09 -.04 -.01 .01 .02 .01 -.01 -.03 -.03 -.02 .03 .15 .36 .69

.06 -.08 -.15 -.16 -.15 -.12 -.07 -.03 .00 .02 .03 .02 .01 -.01 -.02 -.01 .04 .16 .37 .70

DESIGN NO.64325IX, JPL CORRELATOR, RCC, SHIFT LENS, DUMMY AZIMUTH TELESCOPE. 032377 347

FIELD POINT NO.2 .6328-MCR=REF.WVLTH .6328-MCR=WVF.WVLTH

RE-NORMALIZED LEGENDRE COEFFICIENTS

A(0,0)	A(0,1)	A(0,2)	A(0,3)	A(0,4)	A(0,5)	A(0,6)	A(0,7)	A(0,8)
0.000000	0.000000	.095288	.053955	.099118	.003862	-.000863	-.000662	0.000000

A(1,0)	A(1,1)	A(1,2)	A(1,3)	A(1,4)	A(1,5)	A(1,6)	A(1,7)
0.000000	-.039200	.002680	.001949	.001826	-.000380	-.000016	0.000000

A(2,0)	A(2,1)	A(2,2)	A(2,3)	A(2,4)	A(2,5)	A(2,6)
-.013198	-.013926	.003667	-.000318	-.000064	.000100	0.000000

A(3,0)	A(3,1)	A(3,2)	A(3,3)	A(3,4)	A(3,5)
-.013762	.000823	.000070	-.000017	-.000130	0.000000

A(4,0)	A(4,1)	A(4,2)	A(4,3)	A(4,4)
.000023	-.000049	-.000100	-.000043	0.000000

A(5,0)	A(5,1)	A(5,2)	A(5,3)
.000036	-.000151	.000018	0.000000

A(6,0)	A(6,1)	A(6,2)
.000119	.000058	0.000000

A(7,0)	A(7,1)
-.000073	0.000000

A(8,0)
0.000000

.154772=RMS WAVE DEFORMATION

PART III

EVALUATION OF PHASE G WITH THE RANGE CURVATURE CORRECTION LENSES AFTER THE SHIFT LENS.

Phase G

DESIGN NO.64325G1, JPL CORRELATOR, SHIFT LENS NO.2, RCC, AUXILIARY LENSES. 103177- 26

****

2 -2 1 .332500=PM(1) 0.000000=SIN UM(1) 1.000000=HP(1) 0.000000=TAN UP(1)
2 -2 1 1.650000=PM(2) 0.000000=SIN UM(2) .025000=HP(2) 0.000000=TAN UP(2)

25.4MM=UNIT OF LENGTH

		RADIUS,ETC	AXL.DSTNCE	.63280 M-INDEX	.48610 L-INDEX	.65630 U-INDEX	GLASS CODE,NAME	1ST.CA	2ND.CA	STATION
			0.0000	1.00000	1.00000	1.00000		0.00	0.00	132.0518
1	RPH	********* .0000	18.0000	1.00000	1.00000	1.00000	-.000 XXXXXX	0.00	0.00	132.0518
2	SPH	-10.4469	1.8839	1.74969	1.77469	1.74729	755.276 SF4	0.00	0.00	114.0518
3	SPH	-13.4336	.0307	1.00000	1.00000	1.00000	0.000	0.00	0.00	112.1679
4	SPH	31.1330	1.3652	1.74969	1.77469	1.74729	755.276 SF4	0.00	0.00	112.1372
5	SPH	-24.5830	5.5793	1.00000	1.00000	1.00000	0.000	0.00	0.00	110.7720
6	SPH	-14.9126	1.3477	1.50671	1.51423	1.50592	508.612 ZKN7	0.00	0.00	105.1927
7	SPH	15.8548	3.6306	1.00000	1.00000	1.00000	0.000	0.00	0.00	103.8450
8	SPH	24.5464	1.3652	1.74969	1.77469	1.74729	755.276 SF4	0.00	0.00	100.2144
9	SPH	-34.5304	3.5303	1.00000	1.00000	1.00000	0.000	0.00	0.00	98.8492
10	SPH	13.1420	1.8553	1.74969	1.77469	1.74729	755.276 SF4	0.00	0.00	95.3189
11	SPH	10.5330	18.1159	1.00000	1.00000	1.00000	0.000	0.00	0.00	93.4636
12	CYL	4.7071	.2500	1.79883	1.82776	1.79609	805.254 SF6	0.00	0.00	75.3477
13	SPH	28.0492	1.1154	1.00000	1.00000	1.00000	0.000	0.00	0.00	75.0977
14	RTN	-.0948	-.1653	1.00000	1.00000	1.00000	0.000	0.00	0.00	73.9823
15	SPH	-6.6582	.3305	1.79883	1.82776	1.79609	805.254 SF6	0.00	0.00	74.1476
16	CYL	-6.6582	-.1653	1.00000	1.00000	1.00000	0.000	0.00	0.00	73.8171
17	RTN	.0948	1.2919	1.00000	1.00000	1.00000	0.000	0.00	0.00	73.9823
18	RTN	.0948	-.1630	1.00000	1.00000	1.00000	0.000	0.00	0.00	72.6905
19	CYL	-7.3958	.3260	1.79883	1.82776	1.79609	805.254 SF6	0.00	0.00	72.8535
20	SPH	-7.7230	-.1630	1.00000	1.00000	1.00000	0.000	0.00	0.00	72.5275
21	RTN	-.0948	16.0000	1.00000	1.00000	1.00000	0.000	0.00	0.00	72.6905
22	SPH	-10.5330	1.8553	1.74969	1.77469	1.74729	755.276 SF4	0.00	0.00	56.6905
23	SPH	-13.1420	3.5303	1.00000	1.00000	1.00000	0.000	0.00	0.00	54.8352
24	SPH	34.5304	1.3652	1.74969	1.77469	1.74729	755.276 SF4	0.00	0.00	51.3049

25	SPH	-24.5464	3.6303	1.00000	1.00	1.00000	0.000		0.00	0.00	-49.9397
26	SPH	-15.8548	1.3477	1.50671	1.51423	1.50592	508.612	ZKN7	0.00	0.00	46.3094
27	SPH	14.9126	5.5793	1.00000	1.00000	1.00000	0.000		0.00	0.00	44.9617
28	SPH	24.5830	1.3652	1.74969	1.77469	1.74729	755.276	SF4	0.00	0.00	39.3824
29	SPH	-31.1330	.0307	1.00000	1.00000	1.00000	0.000		0.00	0.00	38.0172
30	SPH	13.4336	1.8839	1.74969	1.77469	1.74729	755.276	SF4	0.00	0.00	37.9865
31	SPH	10.4469	13.8798	1.00000	1.00000	1.00000	0.000		0.00	0.00	36.1026
32	CYL	3.6547	.6500	1.63269	1.64909	1.63108	636.353	F6	0.00	0.00	22.2228
33	CYL	-6.4870	.2149	1.00000	1.00000	1.00000	0.000		0.00	0.00	21.5728
34	CYL	-5.2748	.3500	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	21.3579
35	CYL	INFINITE	9.5469	1.00000	1.00000	1.00000	0.000		0.00	0.00	21.0079
36	CYL	INFINITE	.3500	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	11.4610
37	CYL	2.2357	.6000	1.63269	1.64909	1.63108	636.353	F6	0.00	0.00	11.1110
38	CYL	-2.1304	.2026	1.00000	1.00000	1.00000	0.000		0.00	0.00	10.5110
39	CYL	2.5833	.6000	1.63269	1.64909	1.63108	636.353	F6	0.00	0.00	10.3084
40	CYL	-3.2796	.3500	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	9.7084
41	CYL	INFINITE	2.3284	1.00000	1.00000	1.00000	0.000		0.00	0.00	9.3584
42	CYL	-1.7898	.3500	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	7.0300
43	CYL	-5.6466	.0200	1.00000	1.00000	1.00000	0.000		0.00	0.00	6.6800
44	CYL	INFINITE	.3500	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	6.6600
45	CYL	2.4613	.0200	1.00000	1.00000	1.00000	0.000		0.00	0.00	6.3100
46	CYL	.9311	.3500	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	6.2900
47	CYL	1.2905	3.3600	1.00000	1.00000	1.00000	0.000		0.00	0.00	5.9400
48	RTN	.0761	0.0000	1.00000	1.00000	1.00000	0.000		0.00	0.00	2.5800
49	CYL	INFINITE	.4000	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	2.5800
50	CYL	-1.2000	0.0000	1.00000	1.00000	1.00000	0.000		0.00	0.00	2.1800
51	RTN	-.0761	.5000	1.00000	1.00000	1.00000	0.000		0.00	0.00	2.1800
52	CYL	1.2000	.4000	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	1.6800
53	CYL	INFINITE	1.2800	1.00000	1.00000	1.00000	0.000		0.00	0.00	1.2800
54	SPH	INFINITE	-.0283	1.00000	1.00000	1.00000	0.000		0.00	0.00	-.0000

TABLE OF CONSTANTS

1	4.069600E+05	3.906200E-01	-4.557300E+03	1.106000E+02	0.000000E+00

FIRST ORDER PARAMETERS ON MERIDIONAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
-27.670022	999999.999996	-7380.102740	-3609.315838	7090.854430	3481.538592	1.240960
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
1.000000	999999.999996	41.609055	-20.425923	-40.121703	86.743518	-.964254
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
-.964254	0.000000	132.012748	130.771787	-158.441809	.015874	-1.037071
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
0.000000	.000202	12.000000	159.682769	1.928508	1.240960	53.000000

FIRST ORDER PARAMETERS ON EQUATORIAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
175.467238	999999.999996	203.183038	4.659074	-4.292188	.366886	1.308345
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
.025000	999999.999996	-53.171890	8.938286	10.744446	.087623	-.005052
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
-.202070	0.000000	132.080132	130.771787	44.695451	-.307439	-4.948779
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
0.000000	6.411054	35.000000	-43.387106	0.000000	2.107819	47.000000

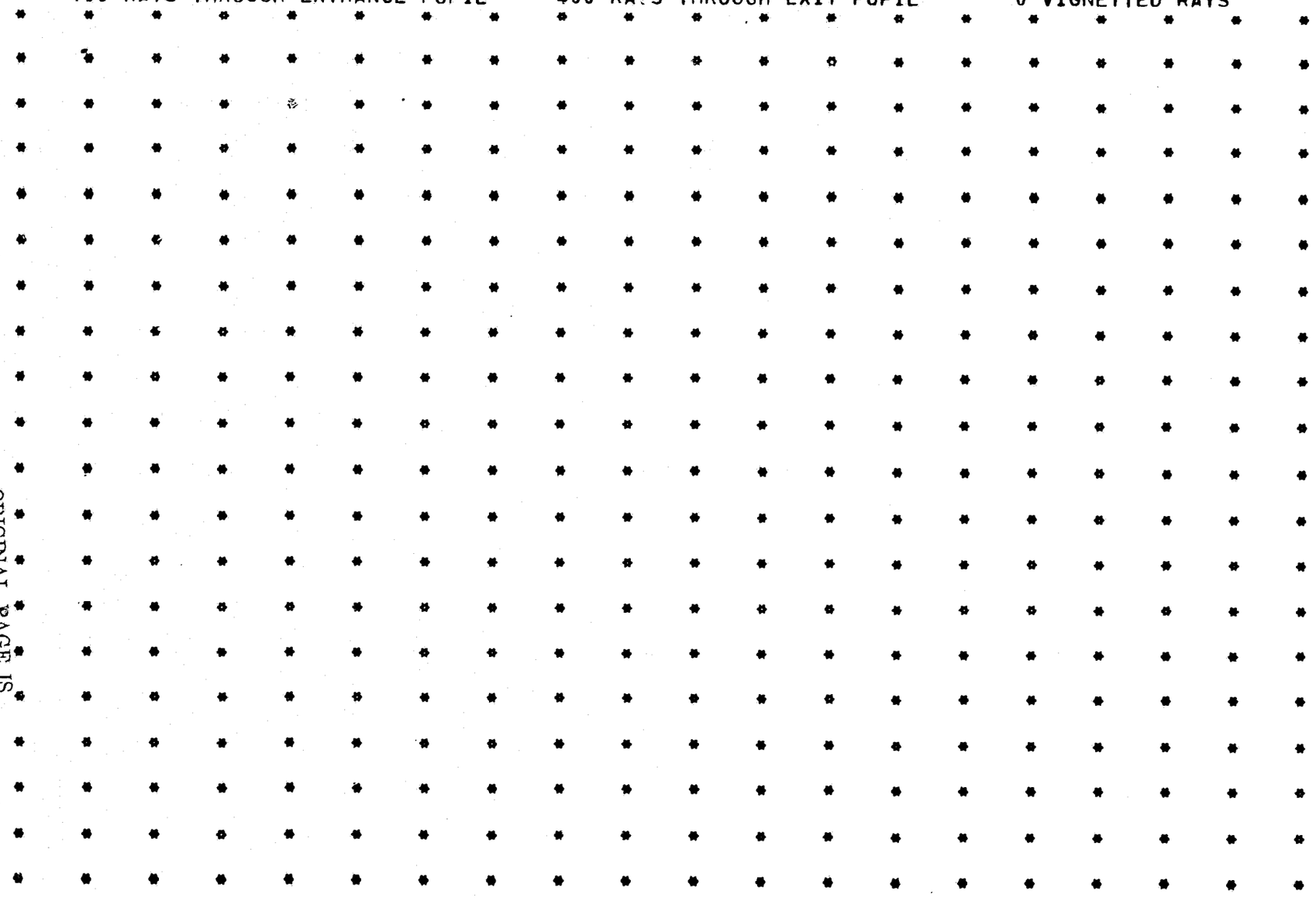
DESIGN NO.64325G1, JPL CORRELATOR, SHIFT LENS NO.2, RCC, AUXILIARY LENSES. 103177- 26

FIELD POINT NO. 0 0.000000=H(Y) 0.000000=H(Z) 0.000000=G(Y) 1.000000=E(Y) 1.000000=E(Z)

-.023602=HPR(Y) 0.000000=HPR(Z) .012471=NA(Y) -.048902=NA(Z)

.6328=REFERENCE FOCUS WAVELENGTH .6328=RAY TRACING WAVELENGTH

400 RAYS THROUGH ENTRANCE PUPIL 400 RAYS THROUGH EXIT PUPIL 0 VIGNETTED RAYS



WAVE ABERRATION (WAVELENGTH UNITS)

.04 -.13 -.23 -.28 -.28 -.27 -.24 -.21 -.19 -.17 -.17 -.19 -.21 -.24 -.27 -.28 -.28 -.23 -.13 .04

.04 -.12 -.22 -.25 -.26 -.24 -.20 -.17 -.15 -.13 -.13 -.15 -.17 -.20 -.24 -.26 -.25 -.22 -.12 .04

.03 -.12 -.20 -.24 -.23 -.21 -.17 -.14 -.11 -.10 -.10 -.11 -.14 -.17 -.21 -.23 -.24 -.20 -.12 .03

.03 -.11 -.20 -.22 -.22 -.19 -.15 -.11 -.08 -.07 -.07 -.08 -.11 -.15 -.19 -.22 -.22 -.20 -.11 .03

.02 -.12 -.19 -.21 -.20 -.17 -.13 -.09 -.06 -.05 -.05 -.06 -.09 -.13 -.17 -.20 -.21 -.19 -.12 .02

.02 -.12 -.19 -.21 -.19 -.16 -.12 -.08 -.05 -.03 -.03 -.05 -.08 -.12 -.16 -.19 -.21 -.19 -.12 .02

.00 -.12 -.19 -.20 -.19 -.15 -.11 -.07 -.03 -.02 -.02 -.03 -.07 -.11 -.15 -.19 -.20 -.19 -.12 .00

.00 -.13 -.19 -.20 -.19 -.15 -.10 -.06 -.03 -.01 -.01 -.03 -.06 -.10 -.15 -.19 -.20 -.19 -.13 .00

-.00 -.13 -.19 -.20 -.18 -.14 -.10 -.06 -.02 -.00 -.00 -.02 -.06 -.10 -.14 -.18 -.20 -.19 -.13 -.00

-.01 -.13 -.19 -.20 -.18 -.14 -.10 -.05 -.02 -.00 -.00 -.02 -.05 -.10 -.14 -.18 -.20 -.19 -.13 -.01

-.01 -.13 -.19 -.20 -.18 -.14 -.10 -.05 -.02 -.00 -.00 -.02 -.05 -.10 -.14 -.18 -.20 -.19 -.13 -.01

-.01 -.13 -.19 -.20 -.18 -.14 -.10 -.05 -.02 -.00 -.00 -.02 -.05 -.10 -.14 -.18 -.20 -.19 -.13 -.01

.00 -.13 -.19 -.20 -.18 -.14 -.10 -.06 -.02 -.01 -.01 -.02 -.06 -.10 -.14 -.18 -.20 -.19 -.13 .00

.01 -.11 -.18 -.19 -.18 -.14 -.10 -.06 -.02 -.01 -.01 -.02 -.06 -.10 -.14 -.18 -.19 -.18 -.11 .01

.03 -.10 -.17 -.19 -.17 -.14 -.10 -.06 -.03 -.01 -.01 -.03 -.06 -.10 -.14 -.17 -.19 -.17 -.10 .03

.06 -.08 -.15 -.18 -.17 -.13 -.09 -.06 -.02 -.01 -.01 -.02 -.06 -.09 -.13 -.17 -.18 -.15 -.08 .06

.09 -.06 -.13 -.16 -.15 -.13 -.09 -.05 -.02 -.01 -.01 -.02 -.05 -.09 -.13 -.15 -.16 -.13 -.06 .09

.13 -.02 -.10 -.14 -.14 -.11 -.08 -.04 -.02 -.00 -.00 -.02 -.04 -.08 -.11 -.14 -.14 -.10 -.02 .13

.18 .02 -.07 -.11 -.12 -.10 -.07 -.03 -.01 .01 .01 -.01 -.03 -.07 -.10 -.12 -.11 -.07 .02 .18

.23 .07 -.03 -.08 -.09 -.07 -.05 -.02 .01 .02 .02 .01 -.02 -.05 -.07 -.09 -.08 -.03 .07 .23

FIELD POINT NO.0 .6328-MCR=REF.WVLTH .6328-MCR=WVF.WVLTH

RE-NORMALIZED LEGENDRE COEFFICIENTS

A(0,0)	A(0,1)	A(0,2)	A(0,3)	A(0,4)	A(0,5)	A(0,6)	A(0,7)	A(0,8)
0.000000	0.000000	.010536	.000000	.074978	.000000	-.001372	.000000	0.000000

A(1,0)	A(1,1)	A(1,2)	A(1,3)	A(1,4)	A(1,5)	A(1,6)	A(1,7)
0.000000	-.000000	.000193	-.000000	.000560	-.000000	.000013	0.000000

A(2,0)	A(2,1)	A(2,2)	A(2,3)	A(2,4)	A(2,5)	A(2,6)
.001505	.000000	.024315	.000000	.000298	.000000	0.000000

A(3,0)	A(3,1)	A(3,2)	A(3,3)	A(3,4)	A(3,5)
-.017047	.000000	-.000089	.000000	-.000020	0.000000

A(4,0)	A(4,1)	A(4,2)	A(4,3)	A(4,4)
.000157	-.000000	.000076	-.000000	0.000000

A(5,0)	A(5,1)	A(5,2)	A(5,3)
.000173	-.000000	.000156	0.000000

A(6,0)	A(6,1)	A(6,2)
-.000056	-.000000	0.000000

A(7,0)	A(7,1)
-.000001	0.000000

A(8,0)
0.000000

.081358=RMS WAVE DEFORMATION

PART IV

PHASE G AND PHASE I, BOTH WITH DUMMY AZIMUTH TELESCOPE
TO SHOW NECESSARY AMOUNT OF REFOCUSING.

Phase G

ESIGN NO.64325GX, JPL CORRELATOR, RCC, SHIFT LENS, DUMMY AZIMUTH TELESCOPE. 032377-331

2 -2 1 .332500=PM(1) 0.000000=SIN UM(1) 1.000000=HP(1) 0.000000=TAN UP(1)
2 -2 1 1.650000=PM(2) 0.000000=SIN UM(2) 0.000000=HP(2) 0.000000=TAN UP(2)

25.4MM=UNIT OF LENGTH

		RADIUS,ETC	AXL.DSTNCE	.63280 M-INDEX	.48610 L-INDEX	.65630 U-INDEX	GLASS CODE,NAME	1ST.CA	2ND.CA	STATION
			0.0000	1.00000	1.00000	1.00000		0.00	0.00	126.9525
1	RTN	0.0000	0.0000	1.00000	1.00000	1.00000	0.000	0.00	0.00	126.9525
2	TRN	0.0000	0.0000	1.00000	1.00000	1.00000	0.000	0.00	0.00	126.9525
3	RPH	********* .0000	0.0000	1.00000	1.00000	1.00000	-.000 XXXXXX	0.00	0.00	126.9525
4	TRN	0.0000	18.0000	1.00000	1.00000	1.00000	0.000	0.00	0.00	126.9525
5	SPH	-10.4469	1.8839	1.74969	1.77469	1.74729	755.276 SF4	0.00	0.00	108.9525
6	SPH	-13.4336	.0307	1.00000	1.00000	1.00000	0.000	0.00	0.00	107.0686
7	SPH	31.1330	1.3652	1.74969	1.77469	1.74729	755.276 SF4	0.00	0.00	107.0379
8	SPH	-24.5830	5.5793	1.00000	1.00000	1.00000	0.000	0.00	0.00	105.6727
9	SPH	-14.9126	1.3477	1.50671	1.51423	1.50592	508.612 ZKN7	0.00	0.00	100.0934
10	SPH	15.8548	3.6306	1.00000	1.00000	1.00000	0.000	0.00	0.00	98.7457
11	SPH	24.5464	1.3652	1.74969	1.77469	1.74729	755.276 SF4	0.00	0.00	95.1151
12	SPH	-34.5304	3.5303	1.00000	1.00000	1.00000	0.000	0.00	0.00	93.7499
13	SPH	13.1420	1.8553	1.74969	1.77469	1.74729	755.276 SF4	0.00	0.00	90.2196
14	SPH	10.5330	16.0000	1.00000	1.00000	1.00000	0.000	0.00	0.00	88.3643
15	RTN	-.0587	-.1653	1.00000	1.00000	1.00000	0.000	0.00	0.00	72.3643
16	SPH	-6.6582	.3305	1.79883	1.82776	1.79609	805.254 SF6	0.00	0.00	72.5295
17	CYL	-6.6582	-.1653	1.00000	1.00000	1.00000	0.000	0.00	0.00	72.1990
18	RTN	.0587	1.2919	1.00000	1.00000	1.00000	0.000	0.00	0.00	72.3643
19	RTN	.0587	-.1630	1.00000	1.00000	1.00000	0.000	0.00	0.00	71.0724
20	CYL	-7.3958	.3260	1.79883	1.82776	1.79609	805.254 SF6	0.00	0.00	71.2354
21	SPH	-7.7230	-.1630	1.00000	1.00000	1.00000	0.000	0.00	0.00	70.9094
22	RTN	-.0587	1.2522	1.00000	1.00000	1.00000	0.000	0.00	0.00	71.0724
23	RTN	0.0000	0.0000	1.00000	1.00000	1.00000	0.000	0.00	0.00	69.8202

24	CYL	5.7668	.2500	1.79883	1.[illegible]76	1.79609	805.254	SF6	0.00	0.00	69.8202
25	SPH	35.1212	0.0000	1.00000	1.00000	1.00000	0.000		0.00	0.00	69.5702
26	RTN	0.0000	17.9790	1.00000	1.00000	1.00000	0.000		0.00	0.00	69.5702
27	SPH	-10.5330	1.8553	1.74969	1.77469	1.74729	755.276	SF4	0.00	0.00	51.5912
28	SPH	-13.1420	3.5303	1.00000	1.00000	1.00000	0.000		0.00	0.00	49.7359
29	SPH	34.5304	1.3652	1.74969	1.77469	1.74729	755.276	SF4	0.00	0.00	46.2056
30	SPH	-24.5464	3.6303	1.00000	1.00000	1.00000	0.000		0.00	0.00	44.8404
31	SPH	-15.8548	1.3477	1.50671	1.51423	1.50592	508.612	ZKN7	0.00	0.00	41.2101
32	SPH	14.9126	5.5793	1.00000	1.00000	1.00000	0.000		0.00	0.00	39.8624
33	SPH	24.5830	1.3652	1.74969	1.77469	1.74729	755.276	SF4	0.00	0.00	34.2831
34	SPH	-31.1330	.0307	1.00000	1.00000	1.00000	0.000		0.00	0.00	32.9179
35	SPH	13.4336	1.8839	1.74969	1.77469	1.74729	755.276	SF4	0.00	0.00	32.8872
36	SPH	10.4469	17.3761	1.00000	1.00000	1.00000	0.000		0.00	0.00	31.0033
37	CYL	4.7640	.6500	1.75759	1.77722	1.75566	.028	XXXXXX	0.00	0.00	13.6271
38	CYL	-4.4429	0.0000	1.00000	1.00000	1.00000	0.000		0.00	0.00	12.9771
39	CYL	-3.6353	0.0000	1.61868	1.63477	1.61711	.029	XXXXXX	0.00	0.00	12.9771
40	CYL	28.9670	8.3670	1.00000	1.00000	1.00000	0.000		0.00	0.00	12.9771
41	CYL	3.3555	.1750	1.79583	1.82462	1.79308	.040	XXXXXX	0.00	0.00	4.6101
42	CYL	-2.1443	4.4351	1.00000	1.00000	1.00000	0.000		0.00	0.00	4.4351
43	SPH	INFINITE	-.0287	1.00000	1.00000	1.00000	0.000		0.00	0.00	.0000

TABLE OF CONSTANTS

3	4.069600E+05	3.906200E-01	-4.557300E+03	1.106000E+02	0.000000E+00

FIRST ORDER PARAMETERS ON MERIDIONAL PLANE

BJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
-27.670022	999999.999996	999999.999996	999999.999996	367233.541038	180404.353465	4.396651
BJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
1.000000	999999.999996	41.609055	-20.440294	-40.177190	4490.108864	-.965588
AGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
-.965588	0.000000	126.914030	122.517379	-150.187400	.000307	-1.035639
PT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
0.000000	1.248490	22.000000	154.584052	1.931175	4.396651	42.000000

FIRST ORDER PARAMETERS ON EQUATORIAL PLANE

BJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
175.467238	999999.999996	0.000000	0.000000	0.000000	999999.999996	4.463801

0.000000	999999.999998	-53.171890	-14.500000	-11.539918	999999.999998	0.000000
AGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
.214322	0.000000	126.981180	122.517379	52.949860	0.000000	4.665871
PT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
0.000000	0.000000	0.000000	-48.486059	0.000000	5.779178	40.000000

DESIGN NO.64325GX, JPL CORRELATOR, RCC, SHIFT LENS; DUMMY AZIMUTH TELESCOPE. 032377-331

FIELD POINT NO. 0 0.000000=H(Y) 0.000000=H(Z) 0.000000=G(Y) 1.000000=E(Y) 1.000000=E(Z)

-.005633=HPR(Y) 0.000000=HPR(Z) .012450=NA(Y) .043292=NA(Z)

.6328=REFERENCE FOCUS WAVELENGTH .6328=RAY TRACING WAVELENGTH

400 RAYS THROUGH ENTRANCE PUPIL 400 RAYS THROUGH EXIT PUPIL 0 VIGNETTED RAYS

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                              WAVE ABERRATION (WAVELENGTH UNITS)

-.00 -.16 -.24 -.28 -.27 -.23 -.19 -.14 -.11 -.09 -.09 -.11 -.14 -.19 -.23 -.27 -.28 -.24 -.16 -.00

 .01 -.14 -.22 -.25 -.24 -.21 -.17 -.12 -.09 -.07 -.07 -.09 -.12 -.17 -.21 -.24 -.25 -.22 -.14  .01

 .03 -.12 -.21 -.24 -.23 -.19 -.15 -.10 -.07 -.05 -.05 -.07 -.10 -.15 -.19 -.23 -.24 -.21 -.12  .03

 .04 -.11 -.20 -.22 -.21 -.18 -.13 -.09 -.05 -.03 -.03 -.05 -.09 -.13 -.18 -.21 -.22 -.20 -.11  .04

 .05 -.10 -.18 -.21 -.20 -.17 -.12 -.08 -.04 -.02 -.02 -.04 -.08 -.12 -.17 -.20 -.21 -.18 -.10  .05

 .05 -.10 -.18 -.20 -.19 -.16 -.11 -.07 -.03 -.01 -.01 -.03 -.07 -.11 -.16 -.19 -.20 -.18 -.10  .05

 .06 -.09 -.18 -.20 -.19 -.15 -.11 -.06 -.03 -.01 -.01 -.03 -.06 -.11 -.15 -.19 -.20 -.18 -.09  .06

 .06 -.09 -.17 -.20 -.19 -.15 -.10 -.06 -.02 -.00 -.00 -.02 -.06 -.10 -.15 -.19 -.20 -.17 -.09  .06

 .06 -.09 -.17 -.20 -.19 -.15 -.10 -.06 -.02 -.00 -.00 -.02 -.06 -.10 -.15 -.19 -.20 -.17 -.09  .06

 .06 -.09 -.17 -.20 -.18 -.15 -.10 -.06 -.02 -.00 -.00 -.02 -.06 -.10 -.15 -.18 -.20 -.17 -.09  .06

 .06 -.09 -.17 -.20 -.18 -.15 -.10 -.06 -.02 -.00 -.00 -.02 -.06 -.10 -.15 -.18 -.20 -.17 -.09  .06

 .06 -.09 -.17 -.20 -.18 -.15 -.10 -.06 -.02 -.00 -.00 -.02 -.06 -.10 -.15 -.18 -.20 -.17 -.09  .06

 .06 -.09 -.17 -.20 -.18 -.15 -.10 -.06 -.02 -.00 -.00 -.02 -.06 -.10 -.15 -.18 -.20 -.17 -.09  .06

 .06 -.08 -.16 -.19 -.18 -.14 -.10 -.05 -.02  .00  .00 -.02 -.05 -.10 -.14 -.18 -.19 -.16 -.08  .06

 .07 -.08 -.16 -.19 -.18 -.14 -.09 -.05 -.02  .00  .00 -.02 -.05 -.09 -.14 -.18 -.19 -.16 -.08  .07

 .08 -.07 -.15 -.18 -.17 -.13 -.09 -.04 -.01  .01  .01 -.01 -.04 -.09 -.13 -.17 -.18 -.15 -.07  .08

 .09 -.06 -.14 -.17 -.16 -.12 -.08 -.04 -.00  .02  .02 -.00 -.04 -.08 -.12 -.16 -.17 -.14 -.06  .09

 .11 -.04 -.12 -.15 -.14 -.11 -.07 -.02  .01  .03  .03  .01 -.02 -.07 -.11 -.14 -.15 -.12 -.04  .11

 .13 -.02 -.11 -.13 -.13 -.09 -.05 -.01  .03  .05  .05  .03 -.01 -.05 -.09 -.13 -.13 -.11 -.02  .13

 .15  .00 -.08 -.11 -.10 -.07 -.03  .02  .05  .07  .07  .05  .02 -.03 -.07 -.10 -.11 -.08  .00  .15
```

FIELD POINT NO.0 .6328-MCR=REF.WVLTH .6328-MCR=WVF.WVLTH

RE-NORMALIZED LEGENDRE COEFFICIENTS

A(0,0)	A(0,1)	A(0,2)	A(0,3)	A(0,4)	A(0,5)	A(0,6)	A(0,7)	A(0,8)
0.000000	0.000000	.008410	.000000	.084005	.000000	-.002940	.000000	0.000000

A(1,0)	A(1,1)	A(1,2)	A(1,3)	A(1,4)	A(1,5)	A(1,6)	A(1,7)
0.000000	.000000	.000144	.000000	.000521	.000000	-.000130	0.000000

A(2,0)	A(2,1)	A(2,2)	A(2,3)	A(2,4)	A(2,5)	A(2,6)
.000169	-.000000	.002934	-.000000	-.000104	-.000000	0.000000

A(3,0)	A(3,1)	A(3,2)	A(3,3)	A(3,4)	A(3,5)
-.013861	.000000	.000120	.000000	-.000046	0.000000

A(4,0)	A(4,1)	A(4,2)	A(4,3)	A(4,4)
.000059	.000000	-.000079	.000000	0.000000

A(5,0)	A(5,1)	A(5,2)	A(5,3)
.000110	.000000	.000135	0.000000

A(6,0)	A(6,1)	A(6,2)
-.000002	.000000	0.000000

A(7,0)	A(7,1)
.000025	0.000000

A(8,0)
0.000000

.085659=RMS WAVE DEFORMATION

Phase I

ESIGN NO.64325IX, JPL CORRELATOR, RCC, SHIFT LENS, DUMMY AZIMUTH TELESCOPE. 032377-335

2 -2 1 .332500=PM(1) 0.000000=SIN UM(1) 1.000000=HP(1) 0.000000=TAN UP(1)
2 -2 1 1.650000=PM(2) 0.000000=SIN UM(2) 0.000000=HP(2) 0.000000=TAN UP(2)

	RADIUS,ETC	AXL.DSTNCE	.63280 M-INDEX	.48610 L-INDEX	.65630 U-INDEX	GLASS CODE,NAME	25.4MM=UNIT OF LENGTH 1ST.CA	2ND.CA	STATION
		0.0000	1.00000	1.00000	1.00000		0.00	0.00	126.9525
1 RTN	-.0053	0.0000	1.00000	1.00000	1.00000	0.000	0.00	0.00	126.9525
2 TRN	-5.4900	0.0000	1.00000	1.00000	1.00000	0.000	0.00	0.00	126.9525
3 RPH	********* .0000	0.0000	1.00000	1.00000	1.00000	-.057 XXXXXX	0.00	0.00	126.9525
4 TRN	5.4900	18.0000	1.00000	1.00000	1.00000	0.000	0.00	0.00	126.9525
5 SPH	-10.4469	1.8839	1.74969	1.77469	1.74729	755.276 SF4	0.00	0.00	108.9525
6 SPH	-13.4336	.0307	1.00000	1.00000	1.00000	0.000	0.00	0.00	107.0686
7 SPH	31.1330	1.3652	1.74969	1.77469	1.74729	755.276 SF4	0.00	0.00	107.0379
8 SPH	-24.5830	5.5793	1.00000	1.00000	1.00000	0.000	0.00	0.00	105.6727
9 SPH	-14.9126	1.3477	1.50671	1.51423	1.50592	508.612 ZKN7	0.00	0.00	100.0934
10 SPH	15.8548	3.6306	1.00000	1.00000	1.00000	0.000	0.00	0.00	98.7457
11 SPH	24.5464	1.3652	1.74969	1.77469	1.74729	755.276 SF4	0.00	0.00	95.1151
12 SPH	-34.5304	3.5303	1.00000	1.00000	1.00000	0.000	0.00	0.00	93.7499
13 SPH	13.1420	1.8553	1.74969	1.77469	1.74729	755.276 SF4	0.00	0.00	90.2196
14 SPH	10.5330	16.0000	1.00000	1.00000	1.00000	0.000	0.00	0.00	88.3643
15 RTN	-.0587	-.1653	1.00000	1.00000	1.00000	0.000	0.00	0.00	72.3643
16 SPH	-6.6582	.3305	1.79883	1.82776	1.79609	805.254 SF6	0.00	0.00	72.5295
17 CYL	-6.6582	-.1653	1.00000	1.00000	1.00000	0.000	0.00	0.00	72.1990
18 RTN	.0587	1.2919	1.00000	1.00000	1.00000	0.000	0.00	0.00	72.3643
19 RTN	.0587	-.1630	1.00000	1.00000	1.00000	0.000	0.00	0.00	71.0724
20 CYL	-7.3958	.3260	1.79883	1.82776	1.79609	805.254 SF6	0.00	0.00	71.2354
21 SPH	-7.7230	-.1630	1.00000	1.00000	1.00000	0.000	0.00	0.00	70.9094
22 RTN	-.0587	1.2522	1.00000	1.00000	1.00000	0.000	0.00	0.00	71.0724
23 RTN	-.0228	0.0000	1.00000	1.00000	1.00000	0.000	0.00	0.00	69.8202

24 CYL		-.7868	.2500	1.76803	1.[illegible]76	1.76604	805.254	SF6	0.00	0.00	69.8202
25 SPH		35.1212	0.0000	1.00000	1.[illegible]000	1.00000	0.000		0.00	0.00	69.5702
26 RTN		.0228	17.9790	1.00000	1.00000	1.00000	0.000		0.00	0.00	69.5702
27 SPH		-10.5330	1.8553	1.74969	1.77469	1.74729	755.276	SF4	0.00	0.00	51.5912
28 SPH		-13.1420	3.5303	1.00000	1.00000	1.00000	0.000		0.00	0.00	49.7359
29 SPH		34.5304	1.3652	1.74969	1.77469	1.74729	755.276	SF4	0.00	0.00	46.2056
30 SPH		-24.5464	3.6303	1.00000	1.00000	1.00000	0.000		0.00	0.00	44.8404
31 SPH		-15.8548	1.3477	1.50671	1.51423	1.50592	508.612	ZKN7	0.00	0.00	41.2101
32 SPH		14.9126	5.5793	1.00000	1.00000	1.00000	0.000		0.00	0.00	39.8624
33 SPH		24.5830	1.3652	1.74969	1.77469	1.74729	755.276	SF4	0.00	0.00	34.2831
34 SPH		-31.1330	.0307	1.00000	1.00000	1.00000	0.000		0.00	0.00	32.9179
35 SPH		13.4336	1.8839	1.74969	1.77469	1.74729	755.276	SF4	0.00	0.00	32.8872
36 SPH		10.4469	17.3592	1.00000	1.00000	1.00000	0.000		0.00	0.00	31.0033
37 CYL		4.7640	.6500	1.75759	1.77722	1.75566	.028	XXXXXX	0.00	0.00	13.6441
38 CYL.		-4.4429	0.0000	1.00000	1.00000	1.00000	0.000		0.00	0.00	12.9941
39 CYL		-3.6353	0.0000	1.61868	1.63477	1.61711	.029	XXXXXX	0.00	0.00	12.9941
40 CYL		28.9670	8.3670	1.00000	1.00000	1.00000	0.000		0.00	0.00	12.9941
41 CYL		3.3555	.1750	1.79583	1.82462	1.79308	.040	XXXXXX	0.00	0.00	4.6270
42 CYL		-2.1443	4.4520	1.00000	1.00000	1.00000	0.000		0.00	0.00	4.4520
43 SPH		INFINITE	-.0127	1.00000	1.00000	1.00000	0.000		0.00	0.00	.0000

TABLE OF CONSTANTS

3	4.069600E+05	3.906200E-01	-4.557300E+03	1.106000E+02	6.563200E+03

FIRST ORDER PARAMETERS ON MERIDIONAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
-27.670022	999999.999996	999999.999996	999999.999996	367233.557985	180404.370414	4.413600
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
1.000000	999999.999996	41.609055	-20.440294	-40.177190	4490.108864	-.965588
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
-.965588	0.000000	126.914030	122.500430	-150.170452	.000307	-1.035639
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
0.000000	1.248490	22.000000	154.584052	1.931175	4.413600	42.000000

FIRST ORDER PARAMETERS ON EQUATORIAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
175.467238	999999.999996	0.000000	0.000000	0.000000	999999.999996	4.464714
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT

0.000000	999999.999996	-53.171890	-14.50[illegible]	-11.393918	999999.999996	0.[illegible]
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
.214322	0.000000	126.965144	122.500430	52.966808	0.000000	4.665871
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
0.000000	0.000000	0.000000	-48.502094	0.000000	5.779494	40.000000

DESIGN NO.64325IX, JPL CORRELATOR, RCC, SHIFT LENS, DUMMY AZIMUTH TELESCOPE. 032377-335

FIELD POINT NO. 0 0.000000=H(Y) 0.000000=H(Z) 0.000000=G(Y) 1.000000=E(Y) 1.000000=E(Z)

-.056984=HPR(Y) .000046=HPR(Z) .012503=NA(Y) .043077=NA(Z)

.6328=REFERENCE FOCUS WAVELENGTH .6328=RAY TRACING WAVELENGTH

400 RAYS THROUGH ENTRANCE PUPIL 400 RAYS THROUGH EXIT PUPIL 0 VIGNETTED RAYS

WAVE ABERRATION (WAVELENGTH UNITS)

.16 -.02 -.12 -.17 -.18 -.16 -.12 -.09 -.06 -.04 -.04 -.06 -.09 -.12 -.16 -.18 -.17 -.12 -.02 .16

.16 -.02 -.12 -.16 -.17 -.15 -.11 -.07 -.04 -.03 -.03 -.04 -.07 -.11 -.15 -.17 -.16 -.12 -.02 .16

.16 -.01 -.12 -.16 -.16 -.14 -.10 -.06 -.03 -.02 -.02 -.03 -.06 -.10 -.14 -.16 -.16 -.12 -.01 .16

.16 -.01 -.12 -.16 -.16 -.14 -.10 -.06 -.03 -.01 -.01 -.03 -.06 -.10 -.14 -.16 -.16 -.12 -.01 .16

.15 -.02 -.12 -.16 -.16 -.13 -.09 -.05 -.02 -.00 -.00 -.02 -.05 -.09 -.13 -.16 -.16 -.12 -.02 .15

.15 -.02 -.12 -.16 -.16 -.13 -.09 -.05 -.02 -.00 -.00 -.02 -.05 -.09 -.13 -.16 -.16 -.12 -.02 .15

.15 -.02 -.12 -.16 -.16 -.13 -.09 -.05 -.02 -.00 -.00 -.02 -.05 -.09 -.13 -.16 -.16 -.12 -.02 .15

.14 -.03 -.12 -.16 -.16 -.14 -.09 -.05 -.02 -.00 -.00 -.02 -.05 -.09 -.14 -.16 -.16 -.12 -.03 .14

.14 -.03 -.12 -.17 -.16 -.14 -.10 -.05 -.02 -.00 -.00 -.02 -.05 -.10 -.14 -.16 -.17 -.12 -.03 .14

.14 -.03 -.12 -.16 -.16 -.14 -.10 -.05 -.02 -.00 -.00 -.02 -.05 -.10 -.14 -.16 -.16 -.12 -.03 .14

.14 -.03 -.12 -.16 -.16 -.14 -.10 -.05 -.02 -.00 -.00 -.02 -.05 -.10 -.14 -.16 -.16 -.12 -.03 .14

.14 -.02 -.12 -.16 -.16 -.13 -.09 -.05 -.02 -.00 -.00 -.02 -.05 -.09 -.13 -.16 -.16 -.12 -.02 .14

.15 -.01 -.11 -.15 -.15 -.13 -.09 -.05 -.02 .00 .00 -.02 -.05 -.09 -.13 -.15 -.15 -.11 -.01 .15

.17 .00 -.10 -.14 -.14 -.12 -.08 -.04 -.01 .01 .01 -.01 -.04 -.08 -.12 -.14 -.14 -.10 .00 .17

.19 .01 -.08 -.13 -.13 -.11 -.07 -.03 -.00 .01 .01 -.00 -.03 -.07 -.11 -.13 -.13 -.08 .01 .19

.21 .04 -.06 -.11 -.11 -.09 -.05 -.02 .01 .03 .03 .01 -.02 -.05 -.09 -.11 -.11 -.06 .04 .21

.24 .07 -.04 -.08 -.09 -.07 -.03 -.00 .03 .04 .04 .03 -.00 -.03 -.07 -.09 -.08 -.04 .07 .24

.27 .10 -.00 -.05 -.06 -.04 -.01 .02 .05 .06 .06 .05 .02 -.01 -.04 -.06 -.05 -.00 .10 .27

.32 .15 .04 -.02 -.03 -.01 .02 .05 .08 .09 .09 .08 .05 .02 -.01 -.03 -.02 .04 .15 .32

.37 .19 .08 .03 .02 .03 .06 .09 .11 .12 .12 .11 .09 .06 .03 .02 .03 .08 .19 .37

DESIGN NO.64325IX, JPL CORRELATOR, RCC, SHIFT LENS, DUMMY AZIMUTH TELESCOPE. 032377 335

FIELD POINT NO.0 .6328-MCR=REF.WVLTH .6328-MCR=WVF.WVLTH

RE-NORMALIZED LEGENDRE COEFFICIENTS

A(0,0)	A(0,1)	A(0,2)	A(0,3)	A(0,4)	A(0,5)	A(0,6)	A(0,7)	A(0,8)
0.000000	0.000000	.042253	.000000	.084630	.000000	-.002892	.000000	0.000000

A(1,0)	A(1,1)	A(1,2)	A(1,3)	A(1,4)	A(1,5)	A(1,6)	A(1,7)
0.000000	.000000	-.004634	.000000	.001677	.000000	-.000173	0.000000

A(2,0)	A(2,1)	A(2,2)	A(2,3)	A(2,4)	A(2,5)	A(2,6)
.026290	-.000000	.008835	-.000000	-.001539	-.000000	0.000000

A(3,0)	A(3,1)	A(3,2)	A(3,3)	A(3,4)	A(3,5)
-.014987	-.000000	-.000414	-.000000	-.000017	0.000000

A(4,0)	A(4,1)	A(4,2)	A(4,3)	A(4,4)
.000087	-.000000	-.000027	-.000000	0.000000

A(5,0)	A(5,1)	A(5,2)	A(5,3)
.000004	-.000000	.000121	0.000000

A(6,0)	A(6,1)	A(6,2)
.000018	-.000000	0.000000

A(7,0)	A(7,1)
.000089	0.000000

A(8,0)
0.000000

C-2

.099883=RMS WAVE DEFORMATION

PART V

DISTRIBUTION OF INTENSITY IN THE IMAGE OF A POINT (POINT SPREAD FUNCTION) OBTAINED BY FOURIER TRANSFORMATION OF THE PUPIL FUNCTION.

Aberration-free system, free aperture.

$OPTIONS 11,12,13,14,22,
$STD
DESIGN NO.XXXXXX, ABERRATION-FREE SYSTEM. 112377- 0

2 2 1 .124378=PM(1) -.012438=SIN UM(1) 0.000000=HP(1) 1.000000=TAN UP(1)
2 2 1 .423729=PM(2) -.042373=SIN UM(2) 0.000000=HP(2) 1.000000=TAN UP(2)

.63280 .48613 .65627 25.4MM=UNIT OF LENGTH

	RADIUS,ETC	AXL.DSTNCE	M-INDEX	L-INDEX	U-INDEX	GLASS CODE,NAME	1ST.CA	2ND.CA	STATION
		0.0000	1.00000	1.00000	1.00000		1.00	0.00	10.0000
1 SPH	INFINITE	10.0000	1.00000	1.00000	1.00000	0.000	0.00	0.00	10.0000
2 SPH	INFINITE	0.0000	1.00000	1.00000	1.00000	0.000	0.00	0.00	0.0000

FIRST ORDER PARAMETERS ON MERIDIONAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
10.000000	0.000000	0.000000	999999.999996	0.000000	0.000000	10.000000
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
10.000000	.248756	-40.200000	999999.999996	-40.200000	.248756	10.000000
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
1.000000	45.000000	10.000000	0.000000	10.000000	45.000000	1.000000
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
.248756	0.000000	1.000000	0.000000	20.000000	10.000000	1.000000

FIRST ORDER PARAMETERS ON EQUATORIAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
10.000000	0.000000	0.000000	999999.999996	0.000000	0.000000	10.000000
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
10.000000	.847458	-11.800000	999999.999996	-11.800000	.847458	10.000000
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
1.000000	45.000000	10.000000	0.000000	10.000000	45.000000	1.000000
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
.847458	0.000000	1.000000	0.000000	20.000000	10.000000	1.000000

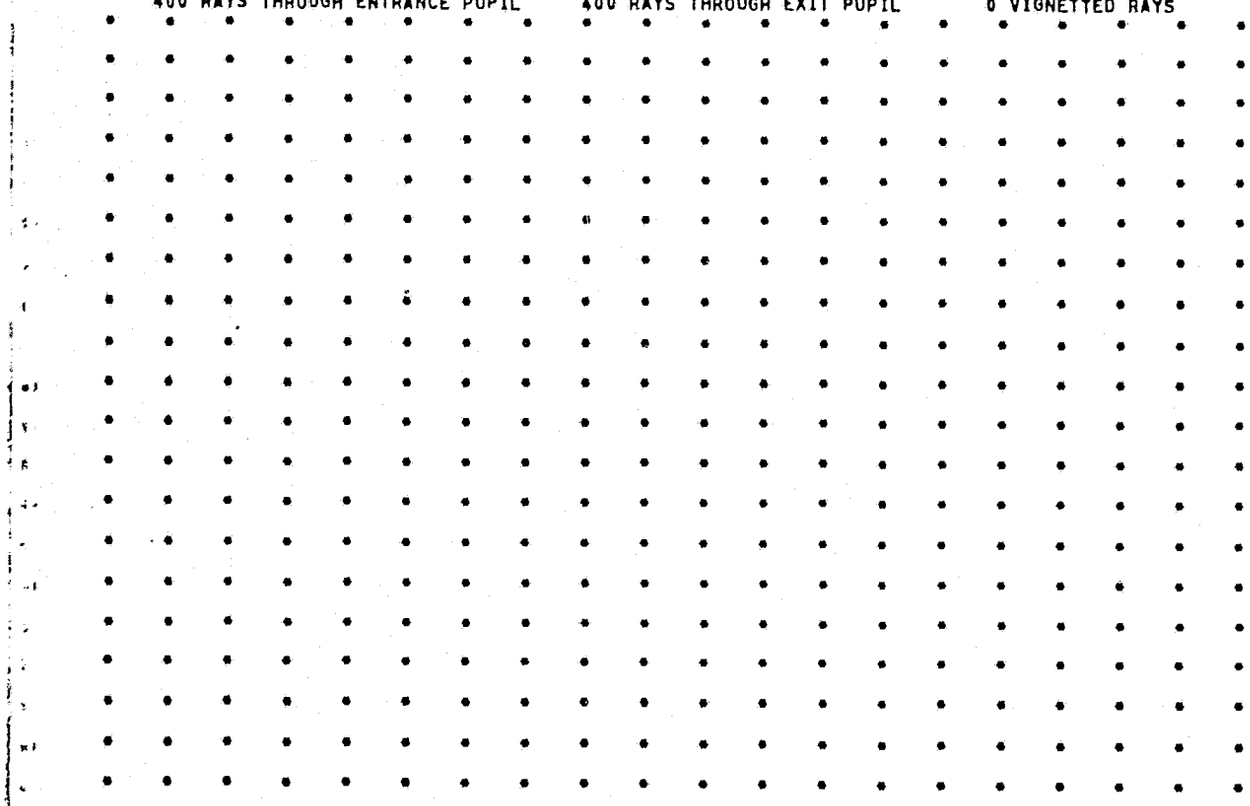
DESIGN NO.XXXXXX, ABERRATION-FREE SYSTEM. 112377- 0

FIELD POINT NO. 0 0.000000=H(Y) 0.000000=H(Z) 0.000000=G(Y) 1.000000=E(Y) 1.000000=E(Z)

0.000000=HPR(Y) 0.000000=HPR(Z) .012438=NA(Y) .042373=NA(Z)

.6328=REFERENCE FOCUS WAVELENGTH .6328=RAY TRACING WAVELENGTH

400 RAYS THROUGH ENTRANCE PUPIL 400 RAYS THROUGH EXIT PUPIL 0 VIGNETTED RAYS



WAVE ABERRATION (WAVELENGTH UNITS)

-.00	.00	-.00	.00	-.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	-.00	.00	-.00	.00	-.00
-.00	.00	-.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	-.00	.00	-.00
.00	.00	-.00	.00	-.00	.00	-.00	.00	.00	.00	.00	.00	.00	-.00	.00	-.00	.00	-.00	.00	.00
-.00	.00	-.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	-.00	.00	-.00
-.00	.00	-.00	.00	.00	-.00	.00	.00	.00	.00	.00	.00	.00	.00	-.00	.00	.00	-.00	.00	-.00
-.00	.00	-.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	-.00	.00	-.00
-.00	.00	-.00	.00	.00	.00	-.00	-.00	.00	.00	.00	.00	-.00	-.00	.00	.00	.00	-.00	.00	-.00
-.00	-.00	-.00	.00	.00	.00	.00	.00	-.00	.00	.00	-.00	.00	.00	.00	.00	.00	-.00	-.00	-.00
-.00	.00	-.00	-.00	-.00	.00	.00	.00	-.00	.00	.00	-.00	.00	.00	.00	-.00	-.00	-.00	.00	-.00
-.00	.00	-.00	-.00	.00	.00	.00	.00	-.00	.00	.00	-.00	.00	.00	.00	.00	-.00	-.00	.00	-.00
-.00	-.00	-.00	-.00	0.00	-.00	.00	-.00	-.00	-.00	-.00	-.00	-.00	.00	-.00	0.00	-.00	-.00	-.00	-.00
-.00	0.00	-.00	-.00	-.00	.00	0.00	.00	-.00	-.00	-.00	-.00	.00	0.00	.00	-.00	-.00	-.00	0.00	-.00
-.00	-.00	-.00	0.00	.00	0.00	0.00	-.00	-.00	-.00	-.00	-.00	-.00	0.00	0.00	.00	0.00	-.00	-.00	-.00
-.00	.00	-.00	-.00	.00	.00	-.00	-.00	-.00	-.00	-.00	-.00	-.00	-.00	.00	.00	-.00	-.00	.00	-.00
-.00	.00	-.00	0.00	0.00	.00	0.00	-.00	-.00	.00	.00	-.00	-.00	0.00	.00	0.00	0.00	-.00	.00	-.00
-.00	0.00	-.00	0.00	-.00	-.00	-.00	-.00	-.00	0.00	0.00	-.00	-.00	-.00	-.00	-.00	0.00	-.00	0.00	-.00
-.00	-.00	-.00	-.00	-.00	-.00	-.00	-.00	-.00	-.00	-.00	-.00	-.00	-.00	-.00	-.00	-.00	-.00	-.00	-.00
-.00	.00	-.00	-.00	-.00	-.00	-.00	-.00	0.00	-.00	-.00	0.00	-.00	-.00	-.00	-.00	-.00	-.00	.00	-.00
-.00	.00	-.00	0.00	-.00	-.00	-.00	-.00	-.00	.00	.00	-.00	-.00	-.00	-.00	-.00	0.00	-.00	.00	-.00
-.00	0.00	-.00	-.00	-.00	-.00	-.00	0.00	-.00	-.00	-.00	-.00	0.00	-.00	-.00	-.00	-.00	-.00	0.00	-.00

SQUARED-COSINE WEIGHTED APERTURE

FILTER WEIGHTS (AMPLITUDE RATIO)

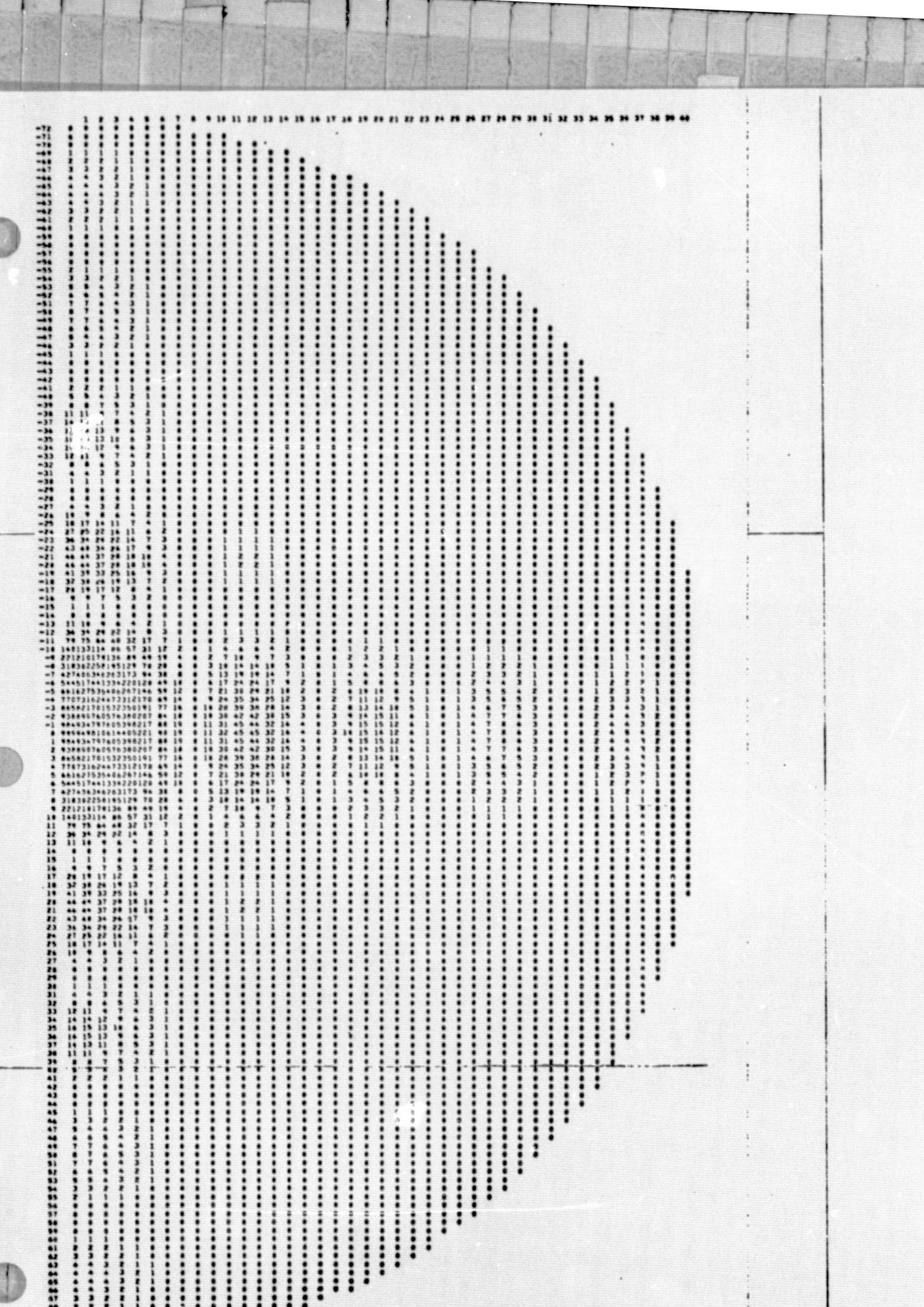
.21	.22	.25	.28	.31	.35	.39	.42	.44	.46	.46	.44	.42	.39	.35	.31	.28	.25	.22	.21
.22	.23	.26	.29	.33	.37	.41	.45	.47	.48	.48	.47	.45	.41	.37	.33	.29	.26	.23	.22
.25	.26	.29	.32	.37	.41	.46	.49	.52	.53	.53	.52	.49	.46	.41	.37	.32	.29	.26	.25
.28	.29	.32	.36	.41	.46	.51	.56	.59	.60	.60	.59	.56	.51	.46	.41	.36	.32	.29	.28
.31	.33	.37	.41	.47	.53	.58	.63	.66	.68	.68	.66	.63	.58	.53	.47	.41	.37	.33	.31
.35	.37	.41	.46	.53	.59	.66	.71	.75	.77	.77	.75	.71	.66	.59	.53	.46	.41	.37	.35
.39	.41	.46	.51	.58	.66	.72	.78	.83	.85	.85	.83	.78	.72	.66	.58	.51	.46	.41	.39
.42	.45	.49	.56	.63	.71	.78	.85	.89	.92	.92	.89	.85	.78	.71	.63	.56	.49	.45	.42
.44	.47	.52	.59	.66	.75	.83	.89	.94	.97	.97	.94	.89	.83	.75	.66	.59	.52	.47	.44
.46	.48	.53	.60	.68	.77	.85	.92	.97	.99	.99	.97	.92	.85	.77	.68	.60	.53	.48	.46
.46	.48	.53	.60	.68	.77	.85	.92	.97	.99	.99	.97	.92	.85	.77	.68	.60	.53	.48	.46
.44	.47	.52	.59	.66	.75	.83	.89	.94	.97	.97	.94	.89	.83	.75	.66	.59	.52	.47	.44
.42	.45	.49	.56	.63	.71	.78	.85	.89	.92	.92	.89	.85	.78	.71	.63	.56	.49	.45	.42
.39	.41	.46	.51	.58	.66	.72	.78	.83	.85	.85	.83	.78	.72	.66	.58	.51	.46	.41	.39
.35	.37	.41	.46	.53	.59	.66	.71	.75	.77	.77	.75	.71	.66	.59	.53	.46	.41	.37	.35
.31	.33	.37	.41	.47	.53	.58	.63	.66	.68	.68	.66	.63	.58	.53	.47	.41	.37	.33	.31
.28	.29	.32	.36	.41	.46	.51	.56	.59	.60	.60	.59	.56	.51	.46	.41	.36	.32	.29	.28
.25	.26	.29	.32	.37	.41	.46	.49	.52	.53	.53	.52	.49	.46	.41	.37	.32	.29	.26	.25
.22	.23	.26	.29	.33	.37	.41	.45	.47	.48	.48	.47	.45	.41	.37	.33	.29	.26	.23	.22
.21	.22	.25	.28	.31	.35	.39	.42	.44	.46	.46	.44	.42	.39	.35	.31	.28	.25	.22	.21

IRRADIANCE ON THE FOCAL PLANE, 1000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= 3.111-MICRONS

VERTICAL SCALE 1-INCH= 10.598-MICRONS

FREE APERTURE

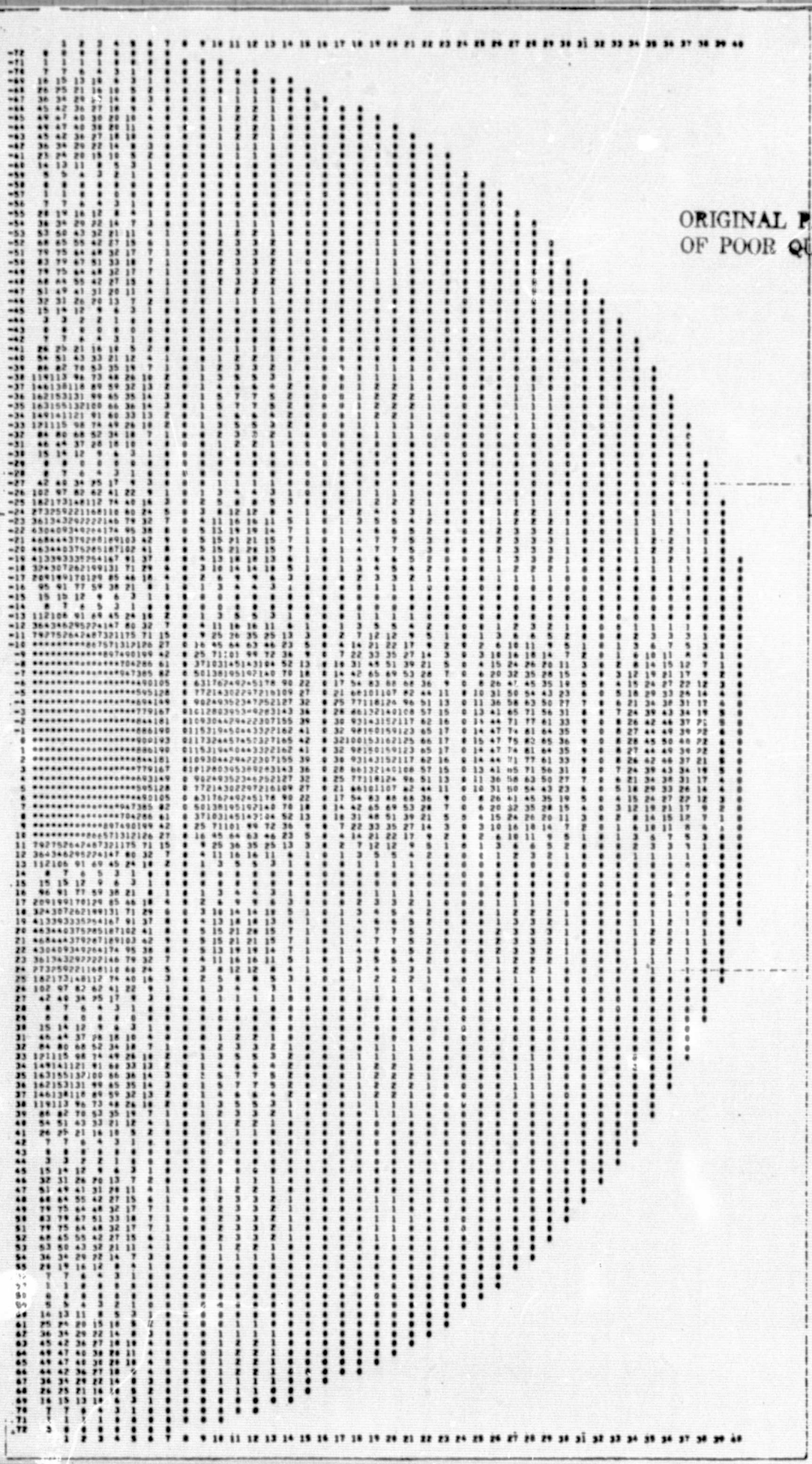


IRRADIANCE ON THE FOCAL PLANE, 10000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= 3.111-MICRONS

VERTICAL SCALE 1-INCH= 10.598-MICRONS

FREE APERTURE



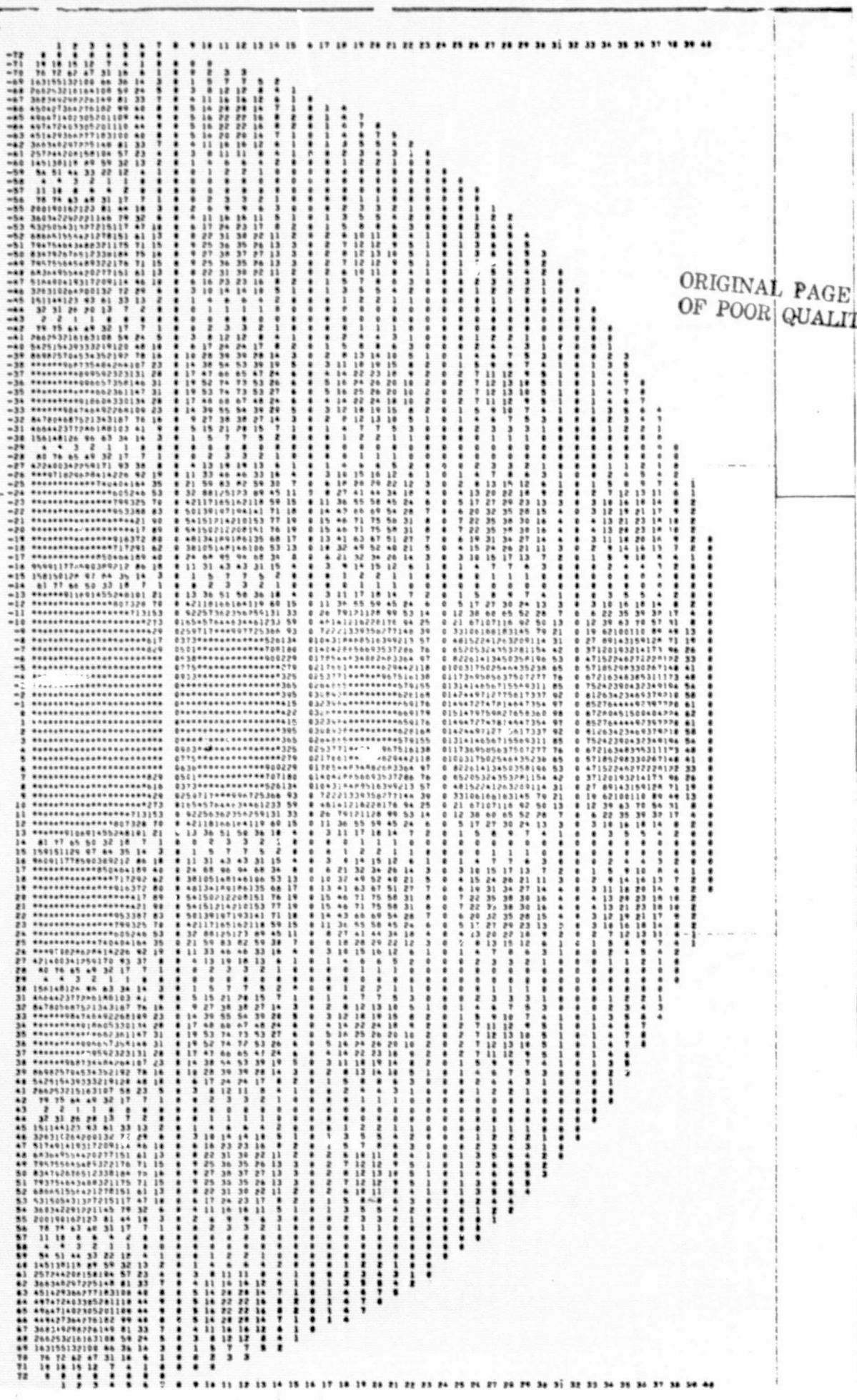
ORIGINAL PAGE IS
OF POOR QUALITY

IRRADIANCE ON THE FOCAL PLANE,100000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= 3.111-MICRONS

VERTICAL SCALE 1-INCH= 10.598-MICRONS

FREE APERTURE



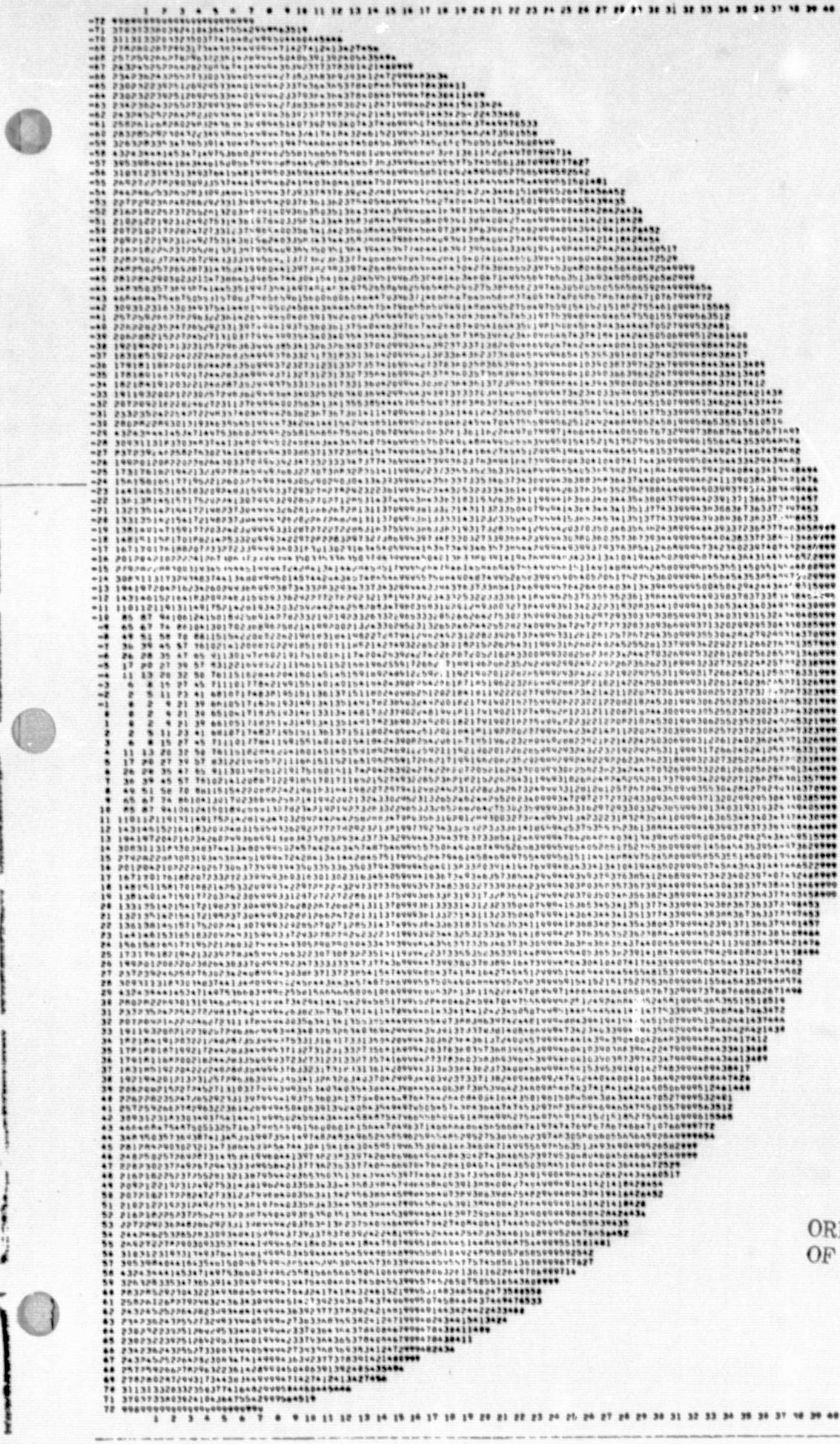
ORIGINAL PAGE IS
OF POOR QUALITY

IRRADIANCE ON THE FOCAL PLANE, 0=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= 3.111-MICRONS

VERTICAL SCALE 1-INCH= 10.598-MICRONS

FREE APERTURE



ORIGINAL PAGE IS
OF POOR QUALITY

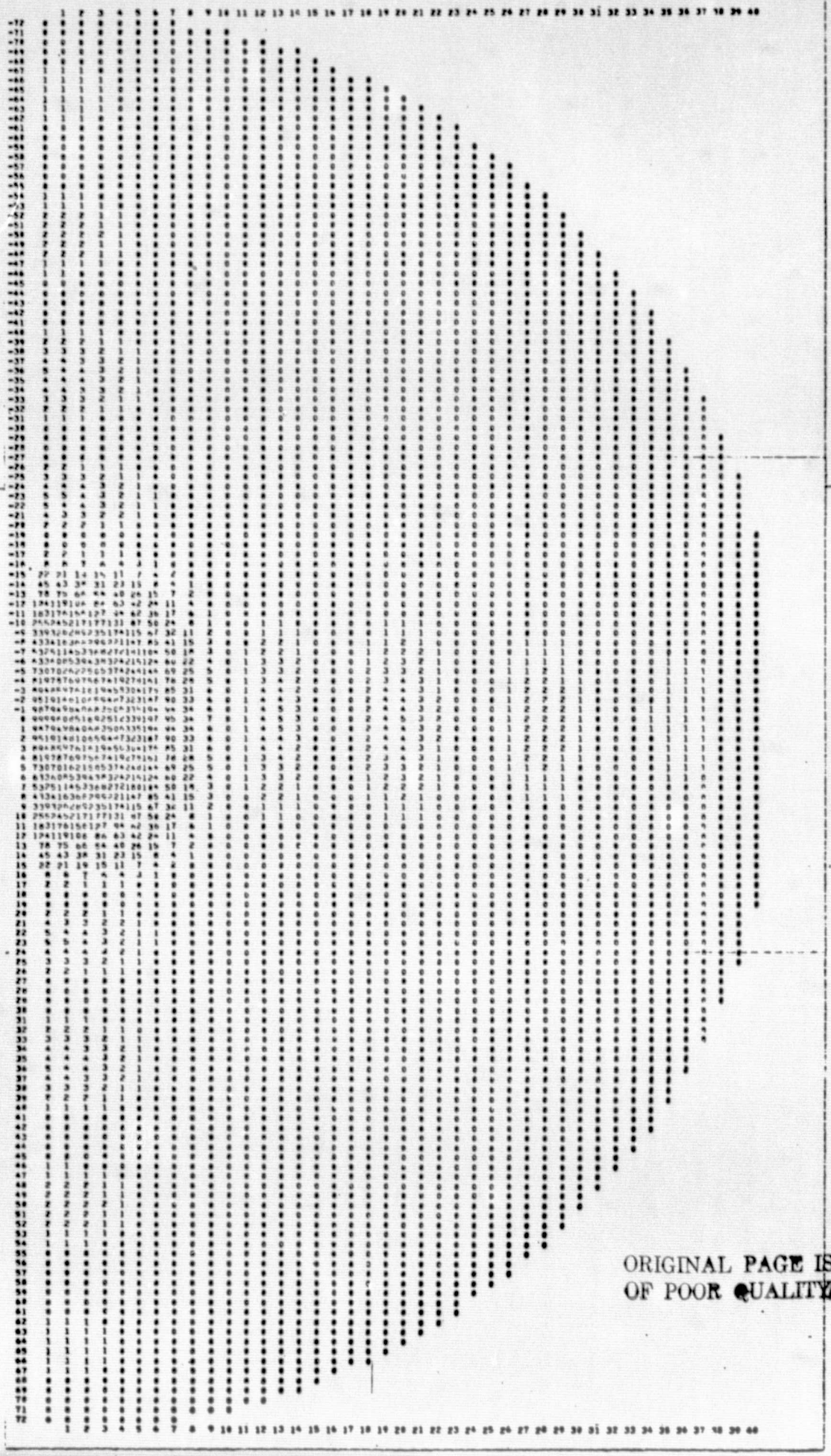
Aberration-free system, $\cos^2$ weighted aperture.

IRRADIANCE ON THE FOCAL PLANE, 1000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= 3.111-MICRONS

VERTICAL SCALE 1-INCH= 10.598-MICRONS

.207FILTER TRANSMITTANCE AT EDGE OF APERTURE



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IRRADIANCE ON THE FOCAL PLANE, 10000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

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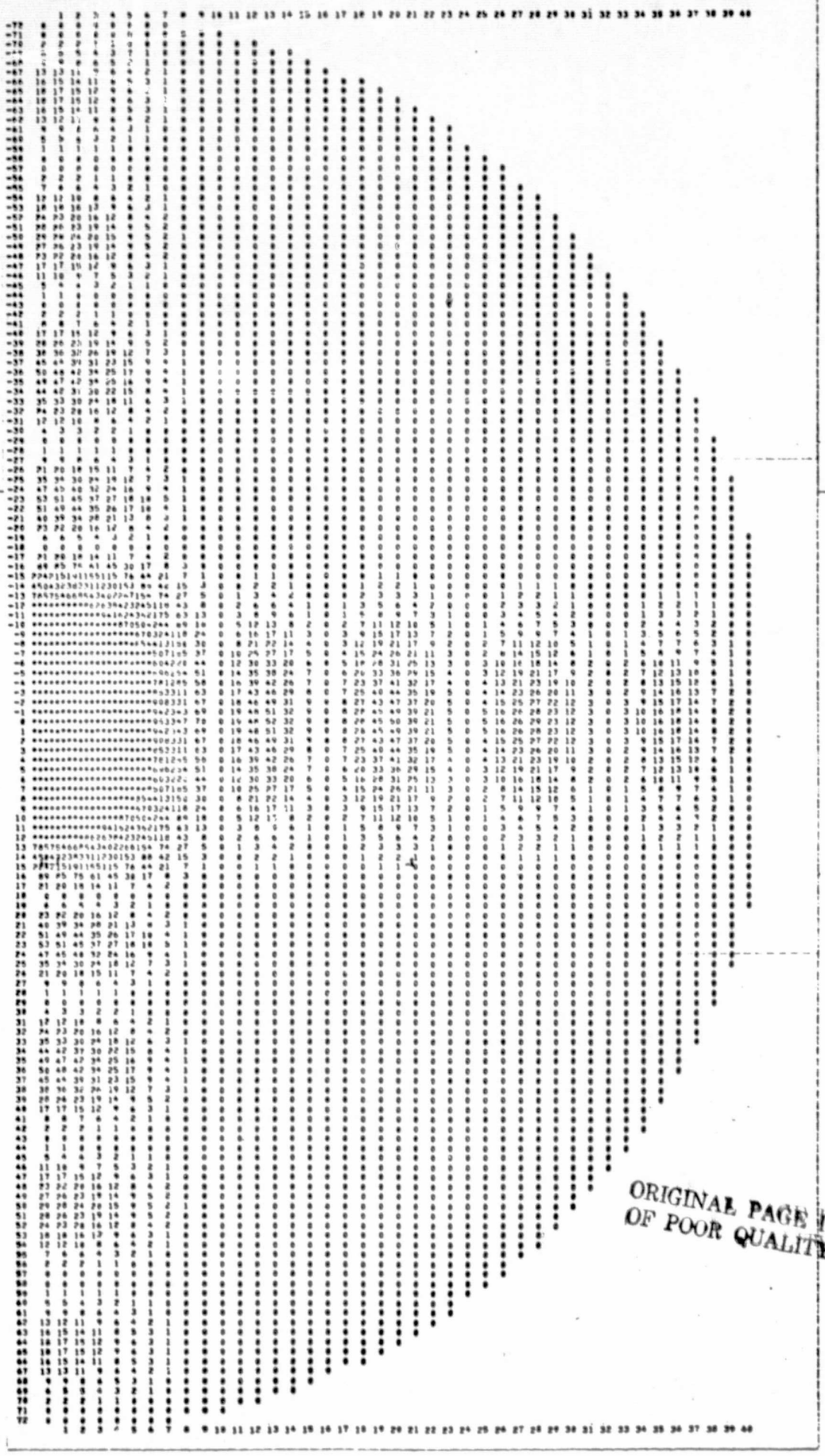
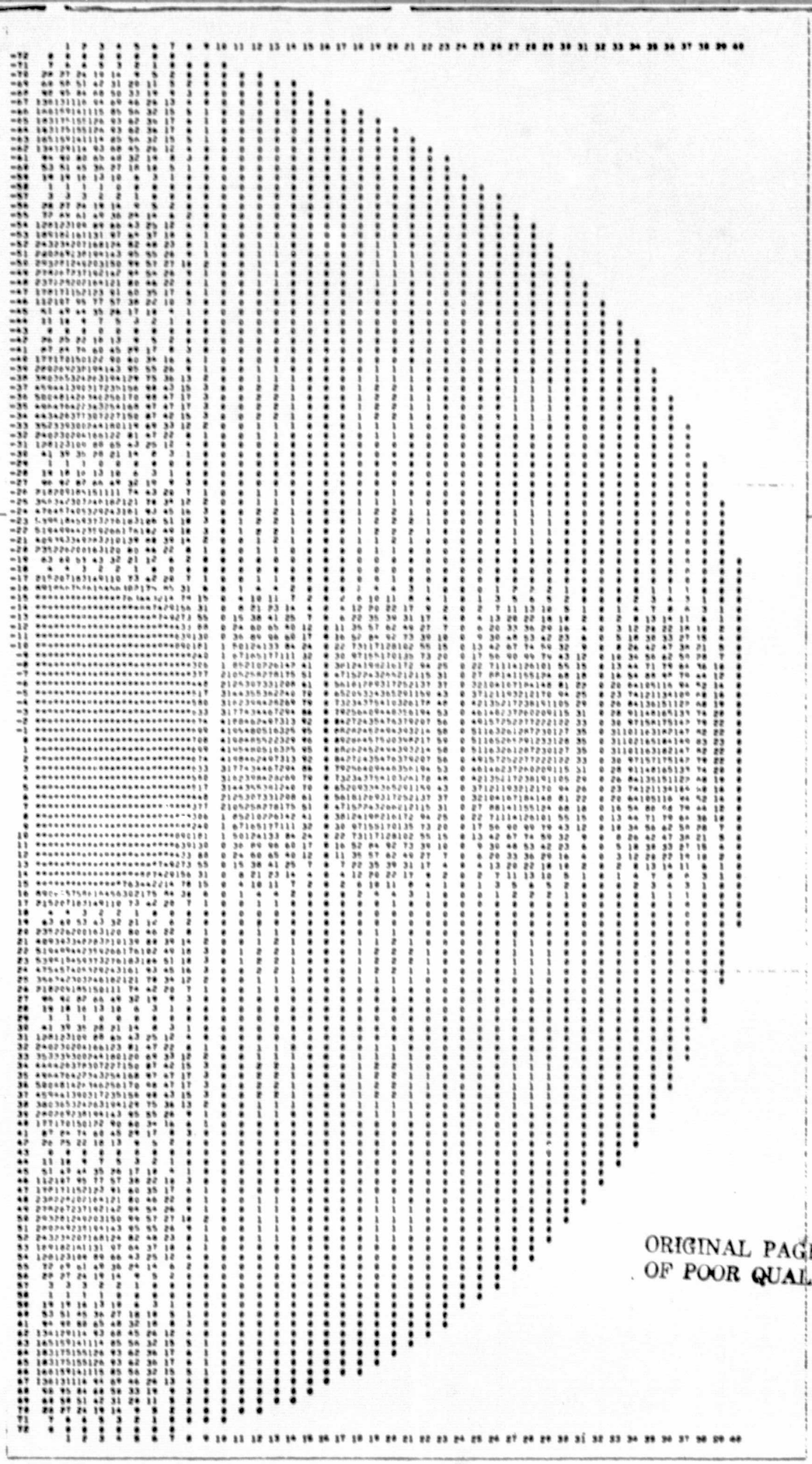


IRRADIANCE ON THE FOCAL PLANE,100000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= 3.111-MICRONS

VERTICAL SCALE 1-INCH= 10.598-MICRONS

.207FILTER TRANSMITTANCE AT EDGE OF APERTURE



ORIGINAL PAGE IS
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IRRADIANCE ON THE FOCAL PLANE, 0=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= 3.111-MICRONS

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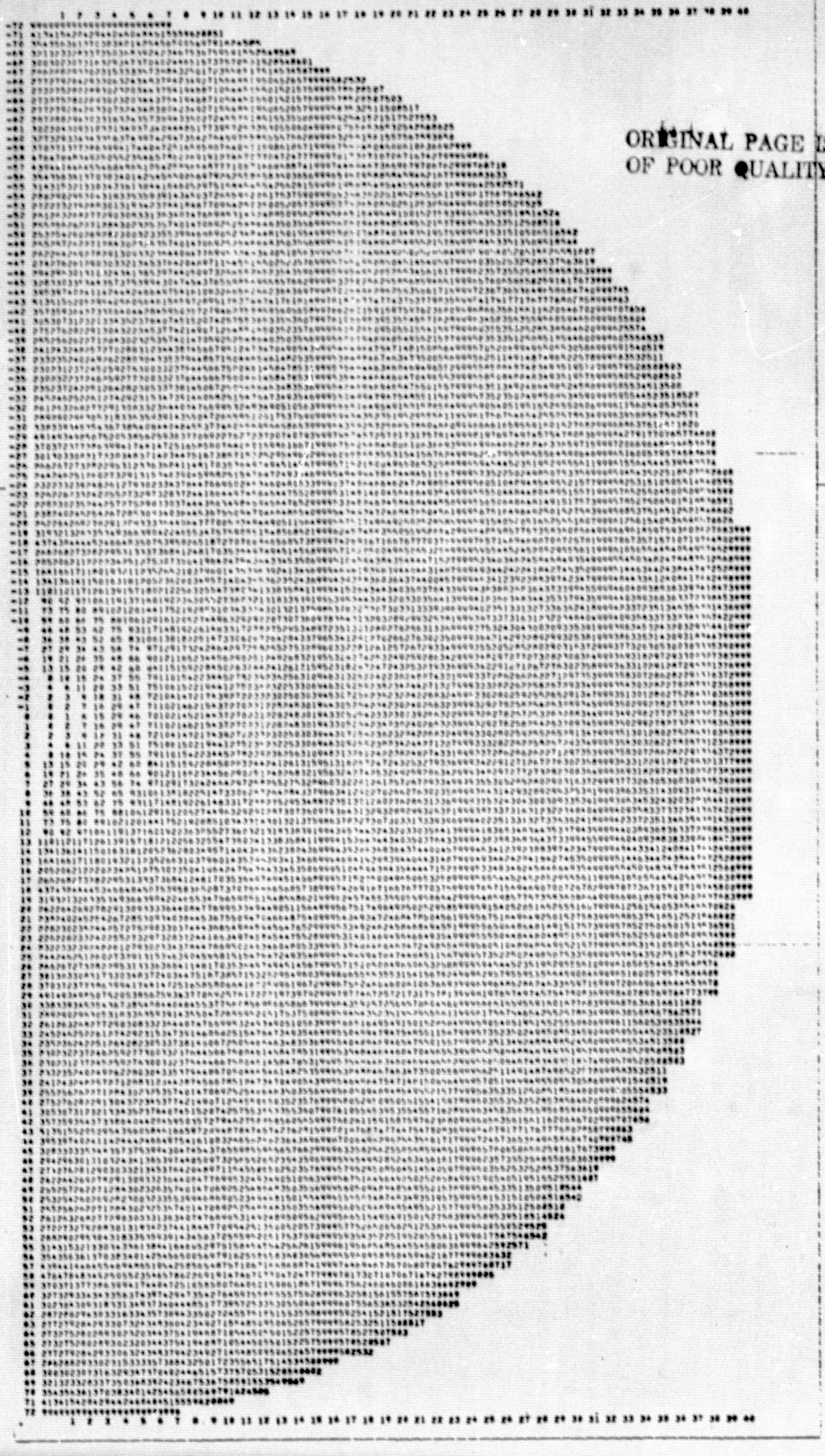
.207FILTER TRANSMITTANCE AT EDGE OF APERTURE



ORIGINAL PAGE IS
OF POOR QUALITY

Phase G

DESIGN NO.64325G, JPL CORRELATOR, RANGE CURVATURE CORRECTOR, SHIFT AND AUXILIARY LENSES 103177- 0

2 -2 1 .332500=PM(1) 0.000000=SIN UM(1) 1.000000=HP(1) 0.000000=TAN UP(1)
2 -2 1 1.650000=PM(2) 0.000000=SIN UM(2) .025000=HP(2) 0.000000=TAN UP(2)

25.4MM=UNIT OF LENGTH

		RADIUS,ETC	AXL.DSTNCE	.63280 M-INDEX	.48610 L-INDEX	.65630 U-INDEX	GLASS CODE,NAME	1ST.CA	2ND.CA	STATION
			0.0000	1.00000	1.00000	1.00000		0.00	0.00	132.0518
1	RPH	********* .0000	18.0000	1.00000	1.00000	1.00000	0.000	0.00	0.00	132.0518
2	SPH	-10.4469	1.8839	1.74969	1.77469	1.74729	755.276 SF4	0.00	0.00	114.0518
3	SPH	-13.4336	.0307	1.00000	1.00000	1.00000	0.000	0.00	0.00	112.1679
4	SPH	31.1330	1.3652	1.74969	1.77469	1.74729	755.276 SF4	0.00	0.00	112.1372
5	SPH	-24.5830	5.5793	1.00000	1.00000	1.00000	0.000	0.00	0.00	110.7720
6	SPH	-14.9126	1.3477	1.50671	1.51423	1.50592	508.612 ZKN7	0.00	0.00	105.1927
7	SPH	15.8548	3.6306	1.00000	1.00000	1.00000	0.000	0.00	0.00	103.8450
8	SPH	24.5464	1.3652	1.74969	1.77469	1.74729	755.276 SF4	0.00	0.00	100.2144
9	SPH	-34.5304	3.5303	1.00000	1.00000	1.00000	0.000	0.00	0.00	98.8492
10	SPH	13.1420	1.8553	1.74969	1.77469	1.74729	755.276 SF4	0.00	0.00	95.3189
11	SPH	10.5330	16.0000	1.00000	1.00000	1.00000	0.000	0.00	0.00	93.4636
12	RTN	-.0587	-.1653	1.00000	1.00000	1.00000	0.000	0.00	0.00	77.4636
13	SPH	-6.6582	.3305	1.79883	1.82776	1.79609	805.254 SF6	0.00	0.00	77.6288
14	CYL	-6.6582	-.1653	1.00000	1.00000	1.00000	0.000	0.00	0.00	77.2983
15	RTN	.0587	1.2919	1.00000	1.00000	1.00000	0.000	0.00	0.00	77.4636
16	RTN	.0587	-.1630	1.00000	1.00000	1.00000	0.000	0.00	0.00	76.1717
17	CYL	-7.3958	.3260	1.79883	1.82776	1.79609	805.254 SF6	0.00	0.00	76.3347
18	SPH	-7.7230	-.1630	1.00000	1.00000	1.00000	0.000	0.00	0.00	76.0087
19	RTN	-.0587	1.2522	1.00000	1.00000	1.00000	0.000	0.00	0.00	76.1717
20	CYL	5.6253	.2500	1.79883	1.82776	1.79609	805.254 SF6	0.00	0.00	74.9195
21	SPH	30.3365	17.9790	1.00000	1.00000	1.00000	0.000	0.00	0.00	74.6695
22	SPH	-10.5330	1.8553	1.74969	1.77469	1.74729	755.276 SF4	0.00	0.00	56.6905
23	SPH	-13.1420	3.5303	1.00000	1.00000	1.00000	0.000	0.00	0.00	54.8352
24	SPH	34.5304	1.3652	1.74969	1.77469	1.74729	755.276 SF4	0.00	0.00	51.3049
25	SPH	-24.5464	3.6303	1.00000	1.00000	1.00000	0.000	0.00	0.00	49.9397

26	SPH	-15.8548	1.3477	1.50671	1.51[illegible]	1.50592	508.612	ZKN7	0.00	0.00	46.3094
27	SPH	14.9126	5.5793	1.00000	1.00000	1.00000	0.000		0.00	0.00	44.9617
28	SPH	24.5830	1.3652	1.74969	1.77469	1.74729	755.276	SF4	0.00	0.00	39.3824
29	SPH	-31.1330	.0307	1.00000	1.00000	1.00000	0.000		0.00	0.00	38.0172
30	SPH	13.4336	1.8839	1.74969	1.77469	1.74729	755.276	SF4	0.00	0.00	37.9865
31	SPH	10.4469	13.8798	1.00000	1.00000	1.00000	0.000		0.00	0.00	36.1026
32	CYL	3.6547	.6500	1.63269	1.64909	1.63108	636.353	F6	0.00	0.00	22.2228
33	CYL	-6.4870	.2149	1.00000	1.00000	1.00000	0.000		0.00	0.00	21.5728
34	CYL	-5.2748	.3500	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	21.3579
35	CYL	INFINITE	9.5469	1.00000	1.00000	1.00000	0.000		0.00	0.00	21.0079
36	CYL	INFINITE	.3500	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	11.4610
37	CYL	2.2357	.6000	1.63269	1.64909	1.63108	636.353	F6	0.00	0.00	11.1110
38	CYL	-2.1304	.2026	1.00000	1.00000	1.00000	0.000		0.00	0.00	10.5110
39	CYL	2.5833	.6000	1.63269	1.64909	1.63108	636.353	F6	0.00	0.00	10.3084
40	CYL	-3.2796	.3500	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	9.7084
41	CYL	INFINITE	2.3284	1.00000	1.00000	1.00000	0.000		0.00	0.00	9.3584
42	CYL	-1.7898	.3500	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	7.0300
43	CYL	-5.6466	.0200	1.00000	1.00000	1.00000	0.000		0.00	0.00	6.6800
44	CYL	INFINITE	.3500	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	6.6600
45	CYL	2.4613	.0200	1.00000	1.00000	1.00000	0.000		0.00	0.00	6.3100
46	CYL	.9311	.3500	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	6.2900
47	CYL	1.2905	3.3600	1.00000	1.00000	1.00000	0.000		0.00	0.00	5.9400
48	RTN	.0761	0.0000	1.00000	1.00000	1.00000	0.000		0.00	0.00	2.5800
49	CYL	INFINITE	.4000	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	2.5800
50	CYL	-1.2000	0.0000	1.00000	1.00000	1.00000	0.000		0.00	0.00	2.1800
51	RTN	.0761	.5000	1.00000	1.00000	1.00000	0.000		0.00	0.00	2.1800
52	CYL	1.2000	.4000	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	1.6800
53	CYL	INFINITE	1.2800	1.00000	1.00000	1.00000	0.000		0.00	0.00	1.2800
54	SPH	INFINITE	-.0305	1.00000	1.00000	1.00000	0.000		0.00	0.00	-.0000

TABLE OF CONSTANTS

1	4.069600E+05	3.906200E-01	-4.557300E+03	1.106000E+02	0.000000E+00

FIRST ORDER PARAMETERS ON MERIDIONAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
-27.670022	999999.999996	999999.999996	999999.999996	372040.205900	182809.719947	1.210148
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
1.000000	999999.999996	41.609055	-20.445409	-40.196955	4547.819820	-.966063
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
-.966063	0.000000	131.981909	130.771761	-158.441783	.000303	-1.035130
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
0.000000	1.248489	19.000000	159.651930	1.932125	1.210148	53.000000

FIRST ORDER PARAMETERS ON EQUATORIAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
175.467238	999999.999996	198.391415	4.166255	-3.781136	.385119	1.310471
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
.025000	999999.999996	-53.171890	9.663495	11.809819	.078354	-.005553
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
-.222106	0.000000	132.082232	130.771761	44.695477	-.343805	-4.502346
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
0.000000	6.479563	35.000000	-43.385006	0.000000	2.109813	47.000000

Field point #0, $r_o - r_c = 0$

Free aperture

DESIGN NO.643256, JPL CORRELATOR, RANGE CURVATURE CORRECTOR, SHIFT AND AUXILIARY LENSES 103177- 0

FIELD POINT NO. 0 0.000000=H(Y) 0.000000=H(Z) 0.000000=G(Y) 1.000000=E(Y) 1.000000=E(Z)

-.022514=HPR(Y) 0.000000=HPR(Z) .012444=NA(Y) -.044719=NA(Z)

.6328=REFERENCE FOCUS WAVELENGTH .6328=RAY TRACING WAVELENGTH

400 RAYS THROUGH ENTRANCE PUPIL 400 RAYS THROUGH EXIT PUPIL 0 VIGNETTED RAYS

WAVE ABERRATION (WAVELENGTH UNITS)

-.00	-.12	-.18	-.19	-.17	-.14	-.10	-.05	-.03	-.01	-.01	-.03	-.05	-.10	-.14	-.17	-.19	-.18	-.12	-.00
-.02	-.13	-.18	-.19	-.17	-.13	-.09	-.05	-.02	-.00	-.00	-.02	-.05	-.09	-.13	-.17	-.19	-.18	-.13	-.02
-.03	-.14	-.19	-.19	-.17	-.13	-.09	-.04	-.01	.00	.00	-.01	-.04	-.09	-.13	-.17	-.19	-.19	-.14	-.03
-.03	-.14	-.19	-.20	-.17	-.13	-.08	-.04	-.01	.01	.01	-.01	-.04	-.08	-.13	-.17	-.20	-.19	-.14	-.03
-.04	-.15	-.20	-.20	-.18	-.13	-.09	-.04	-.01	.01	.01	-.01	-.04	-.09	-.13	-.18	-.20	-.20	-.15	-.04
-.05	-.16	-.20	-.20	-.18	-.14	-.09	-.04	-.01	.01	.01	-.01	-.04	-.09	-.14	-.18	-.20	-.20	-.16	-.05
-.06	-.17	-.21	-.21	-.18	-.14	-.09	-.05	-.01	.00	.00	-.01	-.05	-.09	-.14	-.18	-.21	-.21	-.17	-.06
-.06	-.17	-.21	-.21	-.18	-.14	-.09	-.05	-.02	.00	.00	-.02	-.05	-.09	-.14	-.18	-.21	-.21	-.17	-.06
-.07	-.17	-.21	-.21	-.19	-.14	-.09	-.05	-.02	-.00	-.00	-.02	-.05	-.09	-.14	-.19	-.21	-.21	-.17	-.07
-.06	-.17	-.21	-.22	-.19	-.14	-.10	-.05	-.02	-.00	-.00	-.02	-.05	-.10	-.14	-.19	-.22	-.21	-.17	-.06
-.06	-.16	-.21	-.21	-.19	-.14	-.09	-.05	-.02	-.00	-.00	-.02	-.05	-.09	-.14	-.19	-.21	-.21	-.16	-.06
-.05	-.16	-.21	-.21	-.18	-.14	-.09	-.05	-.02	-.00	-.00	-.02	-.05	-.09	-.14	-.18	-.21	-.21	-.16	-.05
-.03	-.15	-.19	-.20	-.17	-.13	-.09	-.04	-.01	.00	.00	-.01	-.04	-.09	-.13	-.17	-.20	-.19	-.15	-.03
-.02	-.12	-.18	-.18	-.16	-.12	-.08	-.04	-.00	.01	.01	-.00	-.04	-.08	-.12	-.16	-.18	-.18	-.12	-.02
.01	-.10	-.15	-.16	-.14	-.11	-.06	-.02	.01	.02	.02	.01	-.02	-.06	-.11	-.14	-.16	-.15	-.10	.01
.05	-.07	-.13	-.14	-.12	-.09	-.05	-.01	.02	.04	.04	.02	-.01	-.05	-.09	-.12	-.14	-.13	-.07	.05
.09	-.04	-.10	-.11	-.10	-.06	-.02	.01	.04	.06	.06	.04	.01	-.02	-.06	-.10	-.11	-.10	-.04	.09
.13	.01	-.06	-.08	-.06	-.03	.00	.04	.07	.08	.08	.07	.04	.00	-.03	-.06	-.08	-.06	.01	.13
.19	.06	-.01	-.03	-.02	.00	.04	.07	.10	.11	.11	.10	.07	.04	.00	-.02	-.03	-.01	.06	.19
.25	.11	.04	.01	.02	.04	.08	.11	.14	.15	.15	.14	.11	.08	.04	.02	.01	.04	.11	.25

SQUARED-COSINE WEIGHTED APERTURE

FILTER WEIGHTS (AMPLITUDE RATIO)

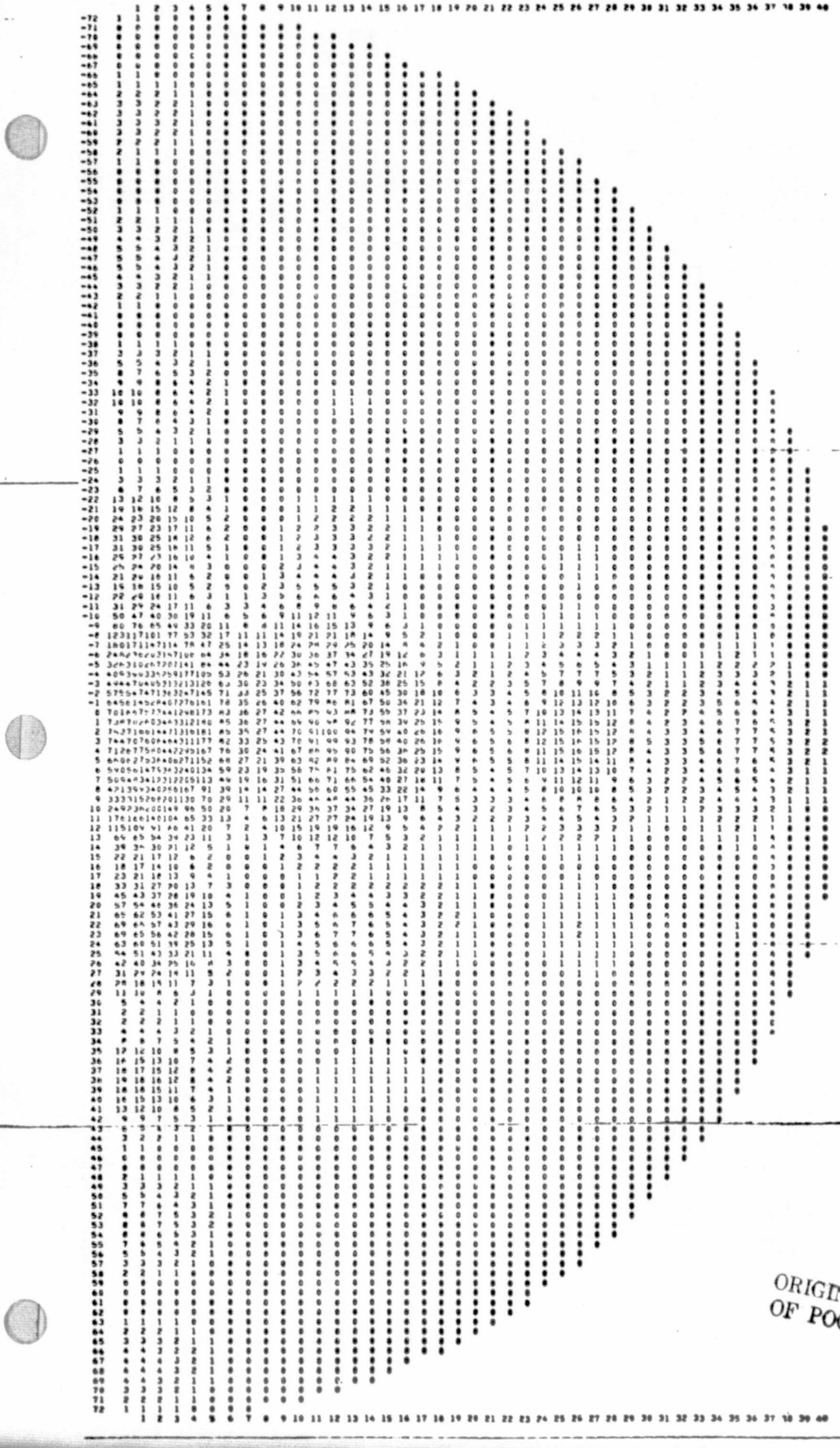
.21	.22	.25	.28	.31	.35	.39	.42	.44	.46	.46	.44	.42	.39	.35	.31	.28	.25	.22	.21
.22	.23	.26	.29	.33	.37	.41	.45	.47	.48	.48	.47	.45	.41	.37	.33	.29	.26	.23	.22
.25	.26	.29	.32	.37	.41	.46	.49	.52	.53	.53	.52	.49	.46	.41	.37	.32	.29	.26	.25
.28	.29	.32	.36	.41	.46	.51	.56	.59	.60	.60	.59	.56	.51	.46	.41	.36	.32	.29	.28
.31	.33	.37	.41	.47	.53	.58	.63	.66	.68	.68	.66	.63	.58	.53	.47	.41	.37	.33	.31
.35	.37	.41	.46	.53	.59	.66	.71	.75	.77	.77	.75	.71	.66	.59	.53	.46	.41	.37	.35
.39	.41	.46	.51	.58	.66	.72	.78	.83	.85	.85	.83	.78	.72	.66	.58	.51	.46	.41	.39
.42	.45	.49	.56	.63	.71	.78	.85	.89	.92	.92	.89	.85	.78	.71	.63	.56	.49	.45	.42
.44	.47	.52	.59	.66	.75	.83	.89	.94	.97	.97	.94	.89	.83	.75	.66	.59	.52	.47	.44
.46	.48	.53	.60	.68	.77	.85	.92	.97	.99	.99	.97	.92	.85	.77	.68	.60	.53	.48	.46
.46	.48	.53	.60	.68	.77	.85	.92	.97	.99	.99	.97	.92	.85	.77	.68	.60	.53	.48	.46
.44	.47	.52	.59	.66	.75	.83	.89	.94	.97	.97	.94	.89	.83	.75	.66	.59	.52	.47	.44
.42	.45	.49	.56	.63	.71	.78	.85	.89	.92	.92	.89	.85	.78	.71	.63	.56	.49	.45	.42
.39	.41	.46	.51	.58	.66	.72	.78	.83	.85	.85	.83	.78	.72	.66	.58	.51	.46	.41	.39
.35	.37	.41	.46	.53	.59	.66	.71	.75	.77	.77	.75	.71	.66	.59	.53	.46	.41	.37	.35
.31	.33	.37	.41	.47	.53	.58	.63	.66	.68	.68	.66	.63	.58	.53	.47	.41	.37	.33	.31
.28	.29	.32	.36	.41	.46	.51	.56	.59	.60	.60	.59	.56	.51	.46	.41	.36	.32	.29	.28
.25	.26	.29	.32	.37	.41	.46	.49	.52	.53	.53	.52	.49	.46	.41	.37	.32	.29	.26	.25
.22	.23	.26	.29	.33	.37	.41	.45	.47	.48	.48	.47	.45	.41	.37	.33	.29	.26	.23	.22
.21	.22	.25	.28	.31	.35	.39	.42	.44	.46	.46	.44	.42	.39	.35	.31	.28	.25	.22	.21

IRRADIANCE ON THE FOCAL PLANE, 1000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.948-MICRONS

VERTICAL SCALE 1-INCH= 10.593-MICRONS

FREE APERTURE

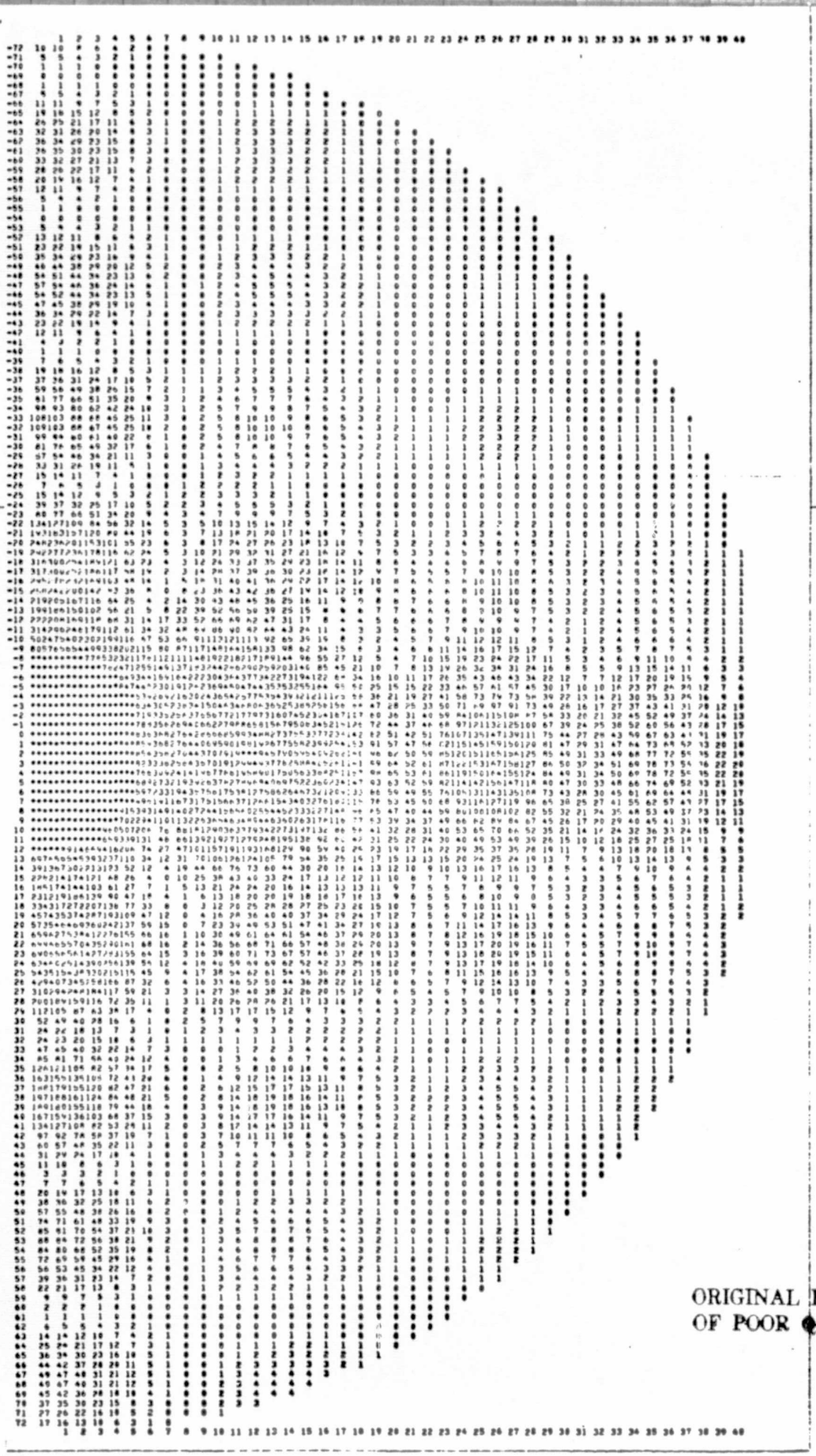


IRRADIANCE ON THE FOCAL PLANE, 10000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.948-MICRONS

VERTICAL SCALE 1-INCH= 10.593-MICRONS

FREE APERTURE



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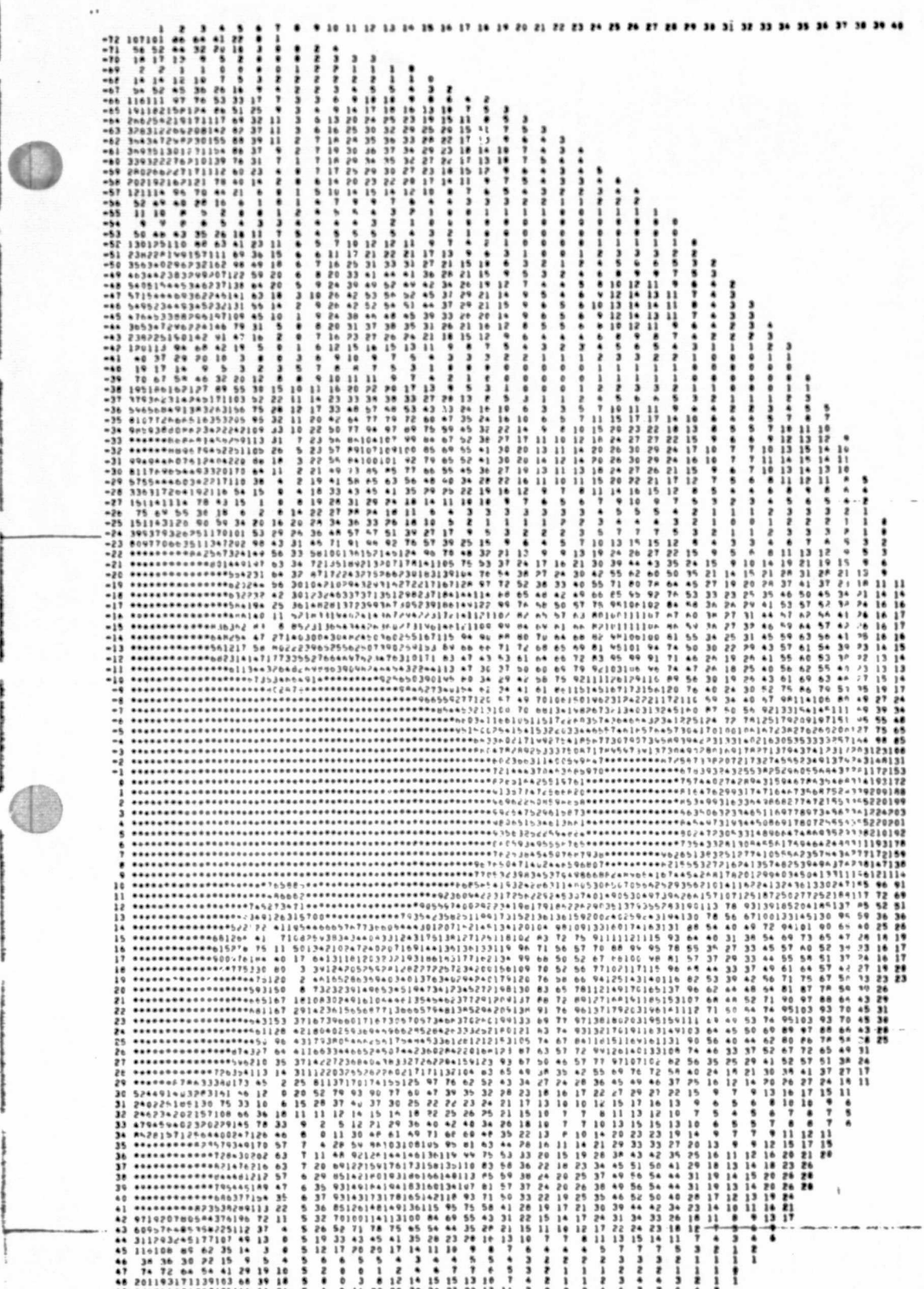
IRRADIANCE ON THE FOCAL PLANE,100000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.948-MICRONS

VERTICAL SCALE 1-INCH= 10.593-MICRONS

FREE APERTURE

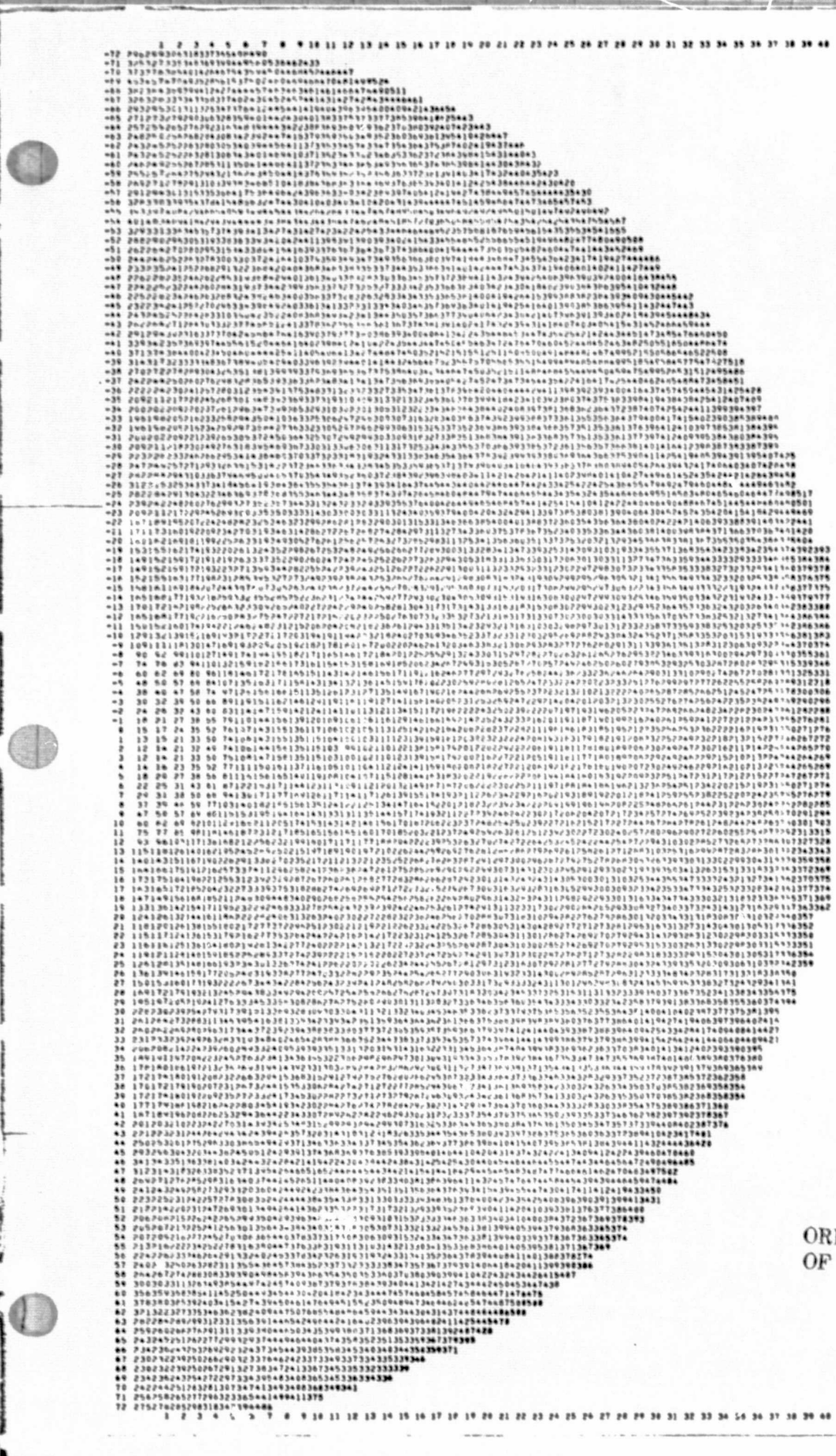


IRRADIANCE ON THE FOCAL PLANE, 0=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.948-MICRONS

VERTICAL SCALE 1-INCH= 10.593-MICRONS

FREE APERTURE



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OF POOR QUALITY

Field point #0, $r_o - r_c = 0$

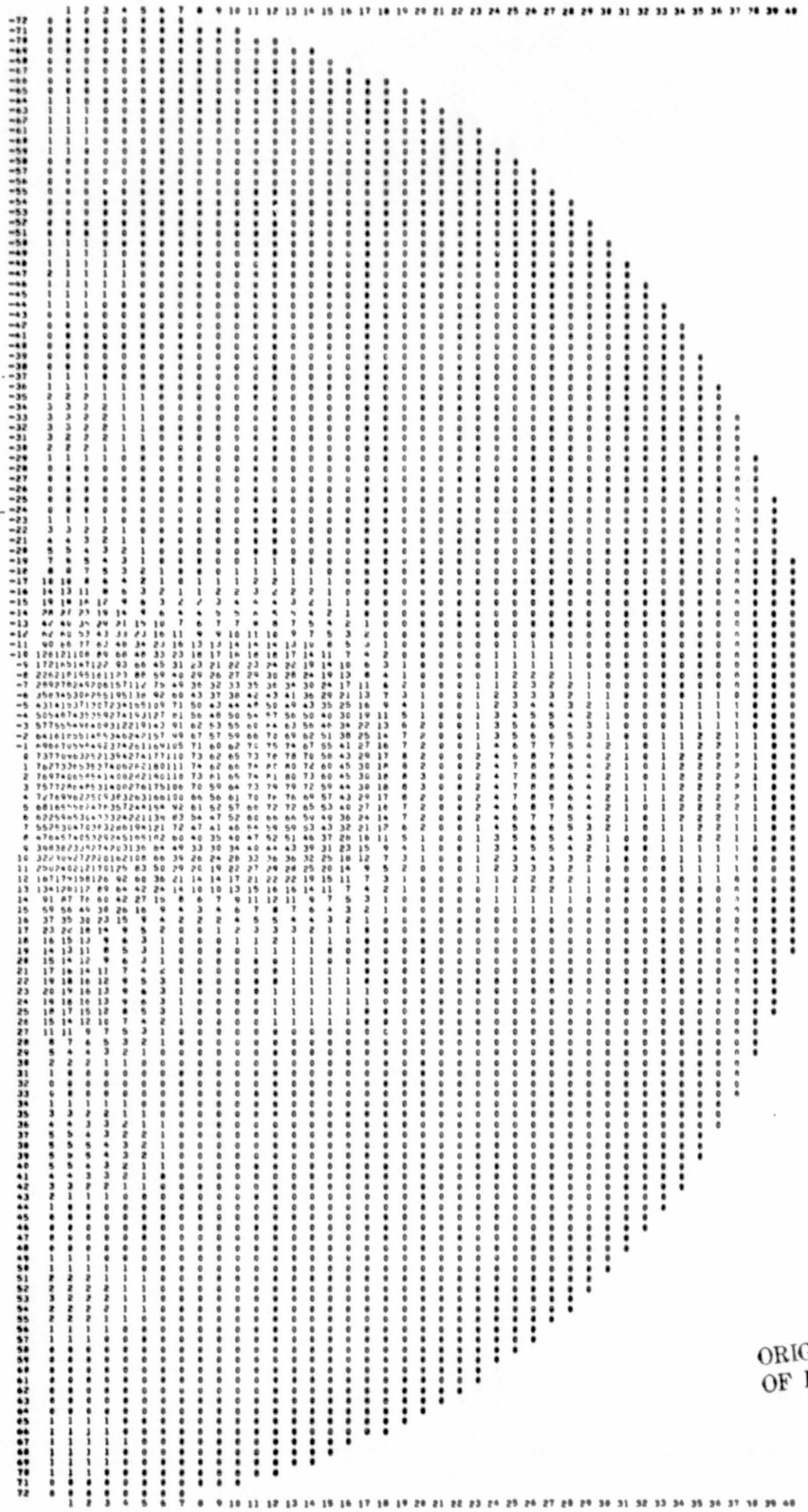
$\cos^2$ weighted aperture

IRRADIANCE ON THE FOCAL PLANE, 1000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.948-MICRONS

VERTICAL SCALE 1-INCH= 10.593-MICRONS

.207FILTER TRANSMITTANCE AT EDGE OF APERTURE

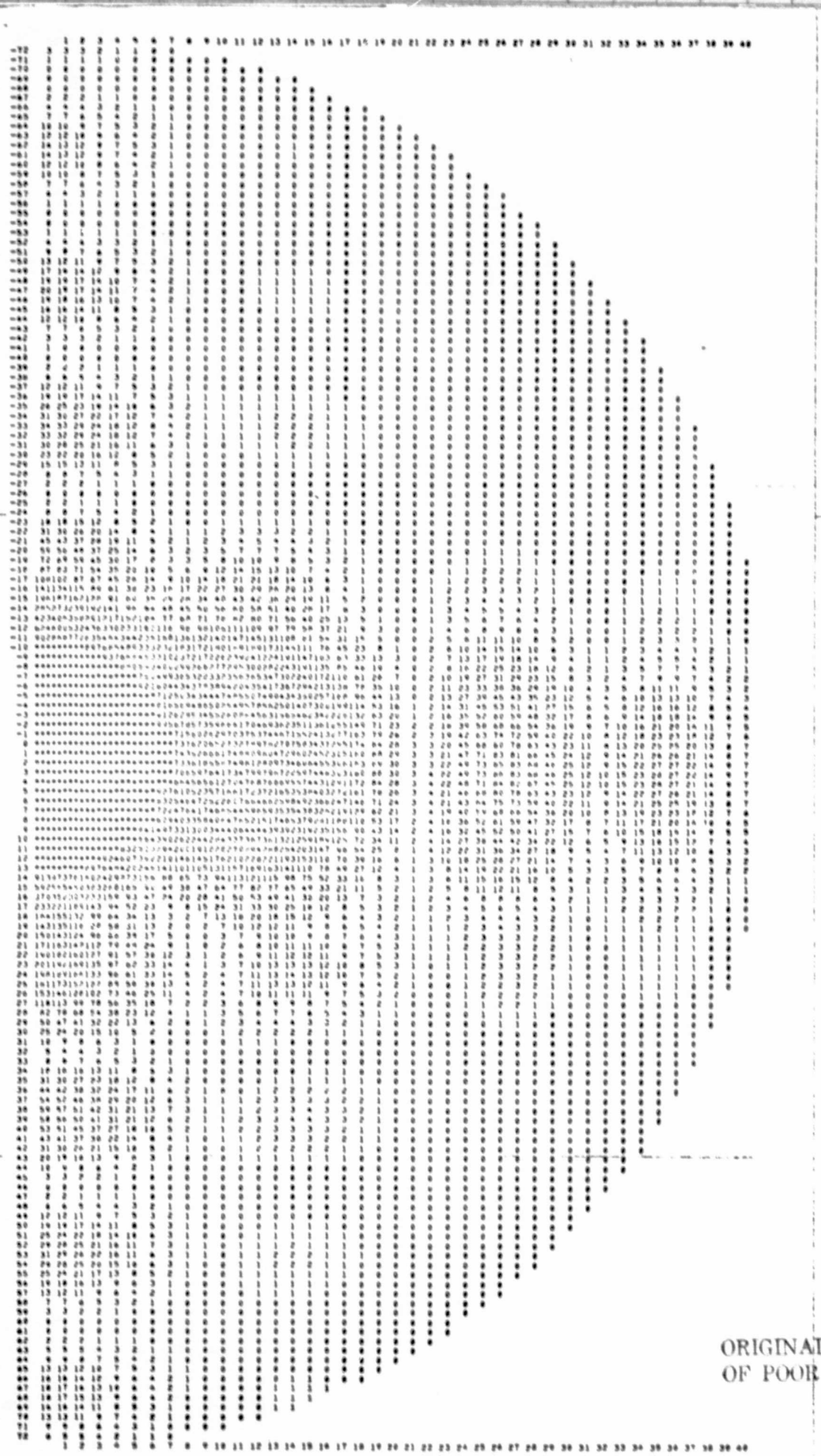


IRRADIANCE ON THE FOCAL PLANE, 10000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.948-MICRONS

VERTICAL SCALE 1-INCH= 10.593-MICRONS

.207FILTER TRANSMITTANCE AT EDGE OF APERTURE

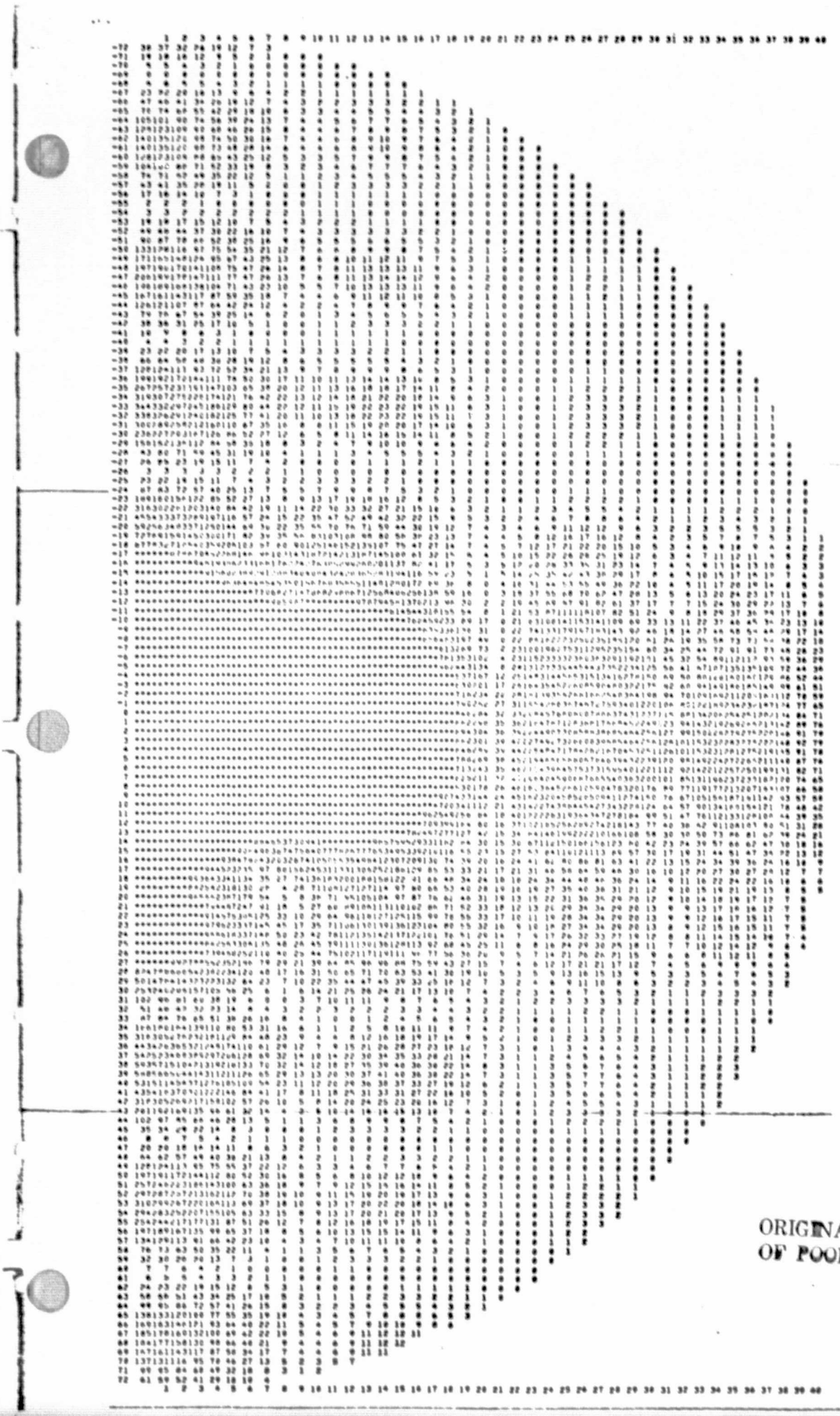


IRRADIANCE ON THE FOCAL PLANE,100000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.948-MICRONS

VERTICAL SCALE 1-INCH= 10.593-MICRONS

.207FILTER TRANSMITTANCE AT EDGE OF APERTURE



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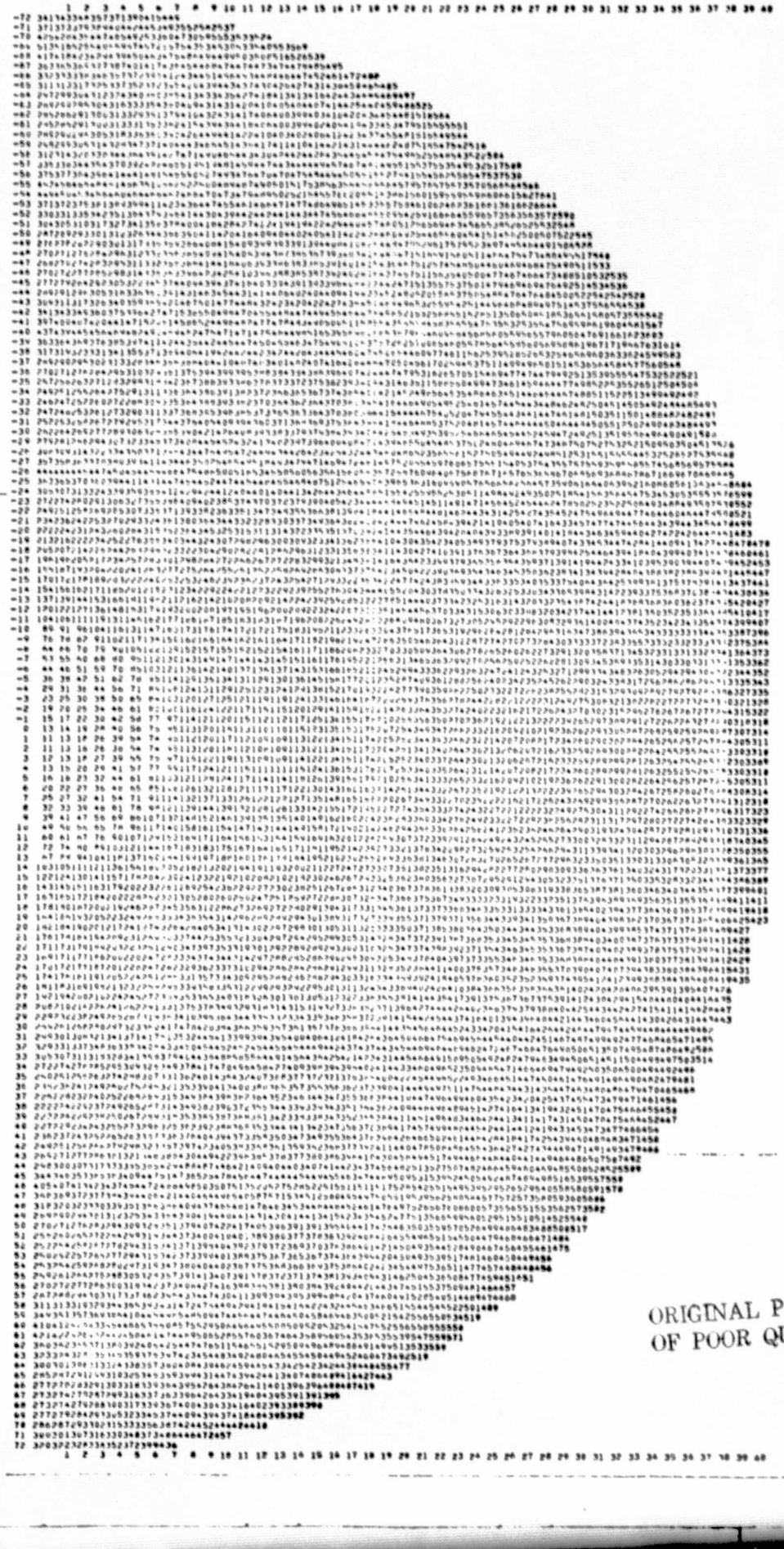
IRRADIANCE ON THE FOCAL PLANE, 0=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.948-MICRONS

VERTICAL SCALE 1-INCH= 10.593-MICRONS

.207FILTER TRANSMITTANCE AT EDGE OF APERTURE



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Field point #1, $r_o - r_c = 1.0$

Free aperture

DESIGN NO.643256, JPL CORRELATOR, RANGE CURVATURE CORRECTOR, SHIFT AND AUXILIARY LENSES 103177- 0

FIELD POINT NO. 1 1.000000=H(Y) 0.000000=H(Z) 0.000000=G(Y) 1.000000=E(Y) 1.014919=E(Z)

-.988130=HPR(Y) 0.000000=HPR(Z) .012446=NA(Y) -.045072=NA(Z)

.6328=REFERENCE FOCUS WAVELENGTH .6328=RAY TRACING WAVELENGTH

400 RAYS THROUGH ENTRANCE PUPIL 400 RAYS THROUGH EXIT PUPIL 0 VIGNETTED RAYS

WAVE ABERRATION (WAVELENGTH UNITS)

-.17 -.30 -.37 -.39 -.38 -.35 -.31 -.28 -.25 -.24 -.24 -.25 -.28 -.31 -.35 -.38 -.39 -.37 -.30 -.17

-.13 -.26 -.32 -.34 -.33 -.30 -.26 -.22 -.20 -.18 -.18 -.20 -.22 -.26 -.30 -.33 -.34 -.32 -.26 -.13

-.10 -.22 -.29 -.30 -.29 -.26 -.22 -.18 -.15 -.14 -.14 -.15 -.18 -.22 -.26 -.29 -.30 -.29 -.22 -.10

-.08 -.19 -.25 -.27 -.25 -.22 -.18 -.14 -.11 -.10 -.10 -.11 -.14 -.18 -.22 -.25 -.27 -.25 -.19 -.08

-.05 -.17 -.23 -.24 -.23 -.19 -.15 -.11 -.08 -.07 -.07 -.08 -.11 -.15 -.19 -.23 -.24 -.23 -.17 -.05

-.03 -.15 -.21 -.22 -.20 -.17 -.13 -.09 -.06 -.04 -.04 -.06 -.09 -.13 -.17 -.20 -.22 -.21 -.15 -.03

-.01 -.13 -.19 -.20 -.19 -.15 -.11 -.07 -.04 -.03 -.03 -.04 -.07 -.11 -.15 -.19 -.20 -.19 -.13 -.01

-.00 -.12 -.18 -.19 -.17 -.14 -.10 -.06 -.03 -.01 -.01 -.03 -.06 -.10 -.14 -.17 -.19 -.18 -.12 -.00

.01 -.11 -.17 -.18 -.16 -.13 -.09 -.05 -.02 -.01 -.01 -.02 -.05 -.09 -.13 -.16 -.18 -.17 -.11 .01

.02 -.10 -.16 -.18 -.16 -.13 -.09 -.05 -.02 -.00 -.00 -.02 -.05 -.09 -.13 -.16 -.18 -.16 -.10 .02

.03 -.09 -.15 -.17 -.16 -.12 -.08 -.05 -.02 -.00 -.00 -.02 -.05 -.08 -.12 -.16 -.17 -.15 -.09 .03

.04 -.09 -.15 -.17 -.16 -.12 -.09 -.05 -.02 -.01 -.01 -.02 -.05 -.09 -.12 -.16 -.17 -.15 -.09 .04

.05 -.08 -.15 -.17 -.16 -.13 -.09 -.05 -.03 -.01 -.01 -.03 -.05 -.09 -.13 -.16 -.17 -.15 -.08 .05

.06 -.07 -.15 -.17 -.16 -.13 -.10 -.06 -.03 -.02 -.02 -.03 -.06 -.10 -.13 -.16 -.17 -.15 -.07 .06

.07 -.07 -.14 -.17 -.16 -.14 -.10 -.07 -.04 -.03 -.03 -.04 -.07 -.10 -.14 -.16 -.17 -.14 -.07 .07

.08 -.06 -.14 -.17 -.16 -.14 -.11 -.08 -.05 -.04 -.04 -.05 -.08 -.11 -.14 -.16 -.17 -.14 -.06 .08

.09 -.05 -.14 -.17 -.17 -.14 -.11 -.08 -.06 -.05 -.05 -.06 -.08 -.11 -.14 -.17 -.17 -.14 -.05 .09

.11 -.04 -.13 -.17 -.17 -.15 -.12 -.09 -.07 -.05 -.05 -.07 -.09 -.12 -.15 -.17 -.17 -.13 -.04 .11

.13 -.02 -.12 -.16 -.17 -.15 -.12 -.10 -.08 -.06 -.06 -.08 -.10 -.12 -.15 -.17 -.16 -.12 -.02 .13

.16 -.01 -.10 -.15 -.16 -.15 -.13 -.10 -.08 -.07 -.07 -.08 -.10 -.13 -.15 -.16 -.15 -.10 -.01 .16

SQUARED-COSINE WEIGHTED APERTURE

FILTER WEIGHTS (AMPLITUDE RATIO)

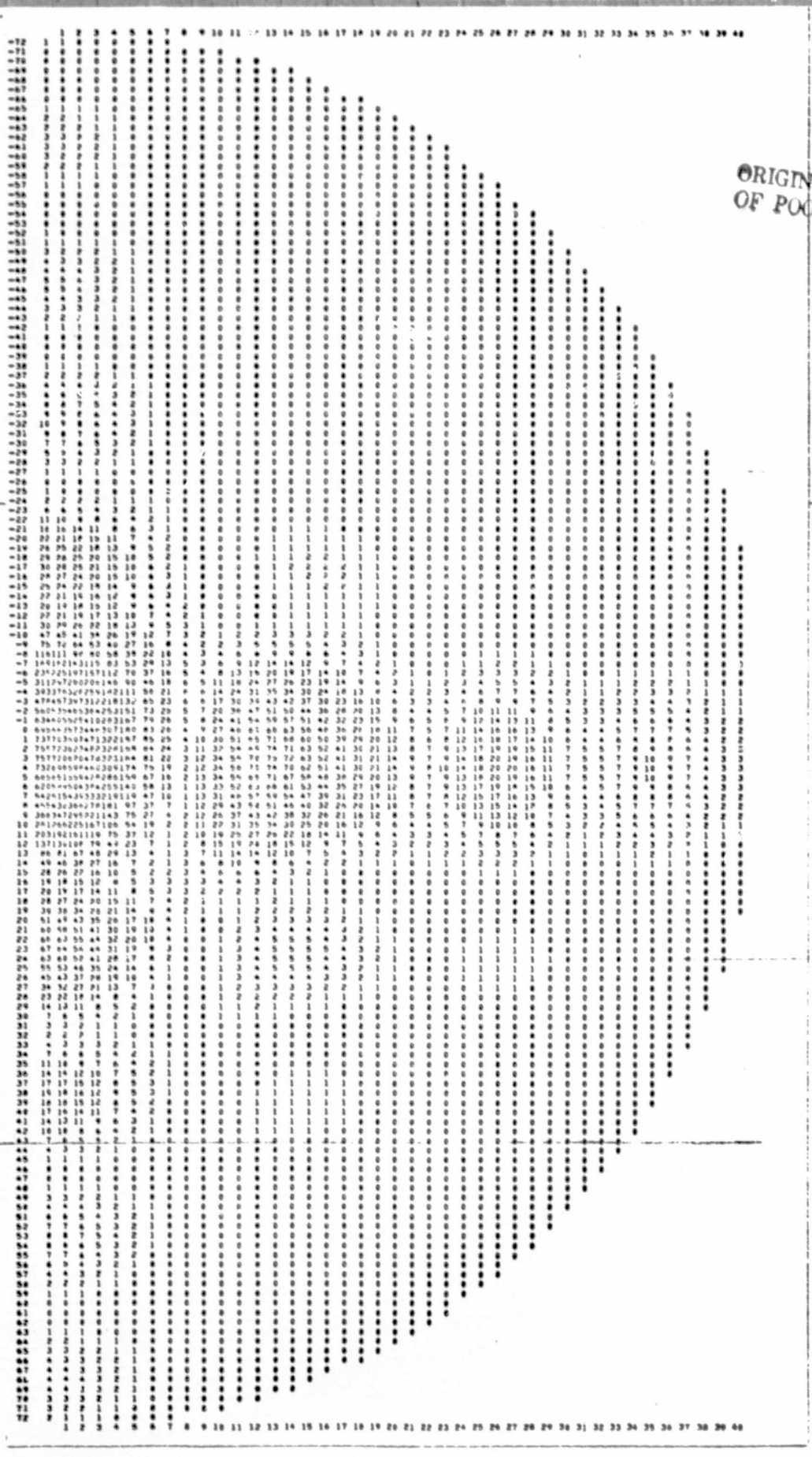
.21	.22	.25	.28	.31	.35	.39	.42	.44	.46	.46	.44	.42	.39	.35	.31	.28	.25	.22	.21
.22	.23	.26	.29	.33	.37	.41	.45	.47	.48	.48	.47	.45	.41	.37	.33	.29	.26	.23	.22
.25	.26	.29	.32	.37	.41	.46	.49	.52	.53	.53	.52	.49	.46	.41	.37	.32	.29	.26	.25
.28	.29	.32	.36	.41	.46	.51	.56	.59	.60	.60	.59	.56	.51	.46	.41	.36	.32	.29	.28
.31	.33	.37	.41	.47	.53	.58	.63	.66	.68	.68	.66	.63	.58	.53	.47	.41	.37	.33	.31
.35	.37	.41	.46	.53	.59	.66	.71	.75	.77	.77	.75	.71	.66	.59	.53	.46	.41	.37	.35
.39	.41	.46	.51	.58	.66	.72	.78	.83	.85	.85	.83	.78	.72	.66	.58	.51	.46	.41	.39
.42	.45	.49	.56	.63	.71	.78	.85	.89	.92	.92	.89	.85	.78	.71	.63	.56	.49	.45	.42
.44	.47	.52	.59	.66	.75	.83	.89	.94	.97	.97	.94	.89	.83	.75	.66	.59	.52	.47	.44
.46	.48	.53	.60	.68	.77	.85	.92	.97	.99	.99	.97	.92	.85	.77	.68	.60	.53	.48	.46
.46	.48	.53	.60	.68	.77	.85	.92	.97	.99	.99	.97	.92	.85	.77	.68	.60	.53	.48	.46
.44	.47	.52	.59	.66	.75	.83	.89	.94	.97	.97	.94	.89	.83	.75	.66	.59	.52	.47	.44
.42	.45	.49	.56	.63	.71	.78	.85	.89	.92	.92	.89	.85	.78	.71	.63	.56	.49	.45	.42
.39	.41	.46	.51	.58	.66	.72	.78	.83	.85	.85	.83	.78	.72	.66	.58	.51	.46	.41	.39
.35	.37	.41	.46	.53	.59	.66	.71	.75	.77	.77	.75	.71	.66	.59	.53	.46	.41	.37	.35
.31	.33	.37	.41	.47	.53	.58	.63	.66	.68	.68	.66	.63	.58	.53	.47	.41	.37	.33	.31
.28	.29	.32	.36	.41	.46	.51	.56	.59	.60	.60	.59	.56	.51	.46	.41	.36	.32	.29	.28
.25	.26	.29	.32	.37	.41	.46	.49	.52	.53	.53	.52	.49	.46	.41	.37	.32	.29	.26	.25
.22	.23	.26	.29	.33	.37	.41	.45	.47	.48	.48	.47	.45	.41	.37	.33	.29	.26	.23	.22
.21	.22	.25	.28	.31	.35	.39	.42	.44	.46	.46	.44	.42	.39	.35	.31	.28	.25	.22	.21

IRRADIANCE ON THE FOCAL PLANE, 1000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.924-MICRONS

VERTICAL SCALE 1-INCH= 10.591-MICRONS

FREE APERTURE

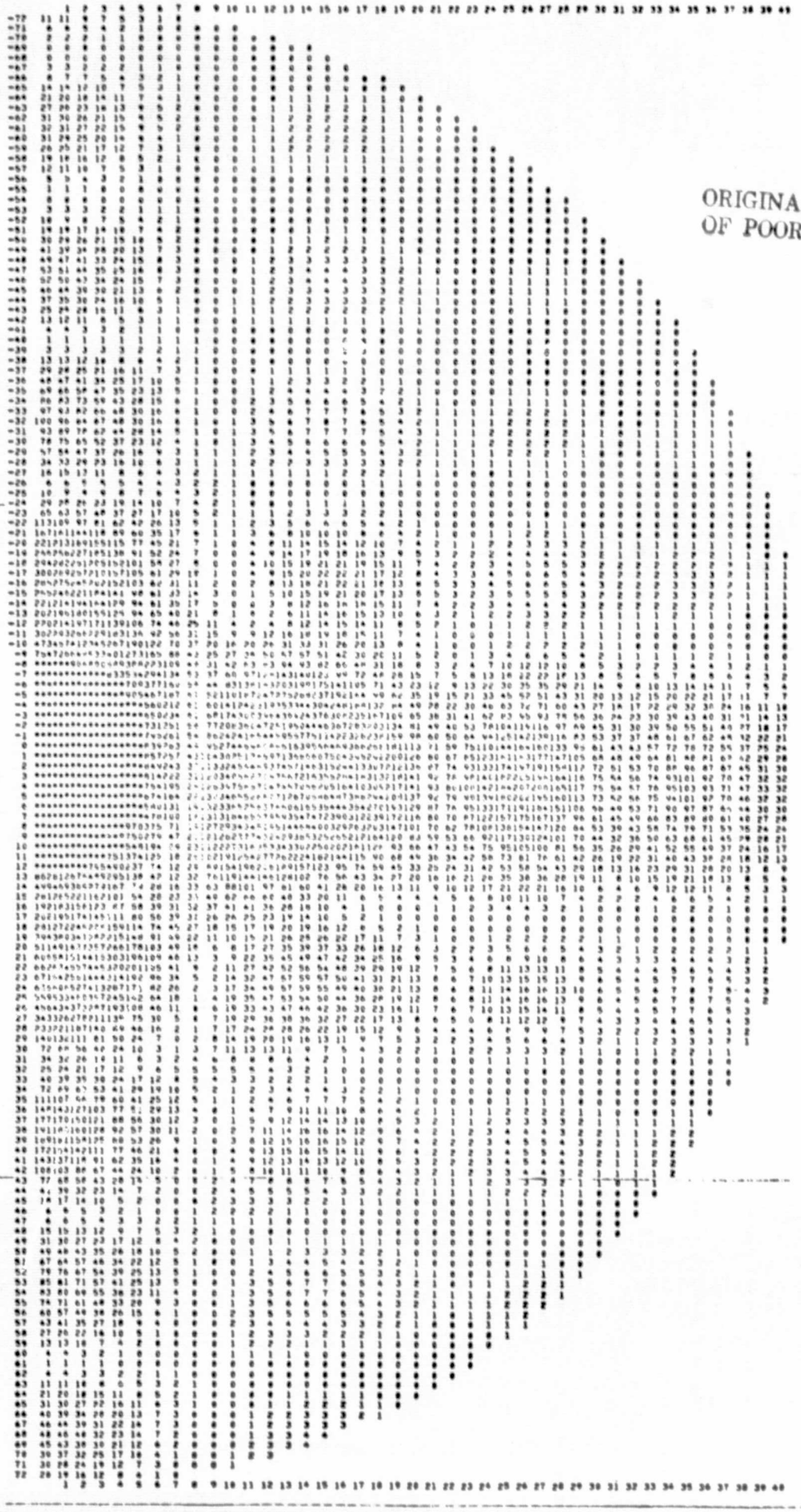


IRRADIANCE ON THE FOCAL PLANE, 10000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.924-MICRONS

VERTICAL SCALE 1-INCH= 10.591-MICRONS

FREE APERTURE



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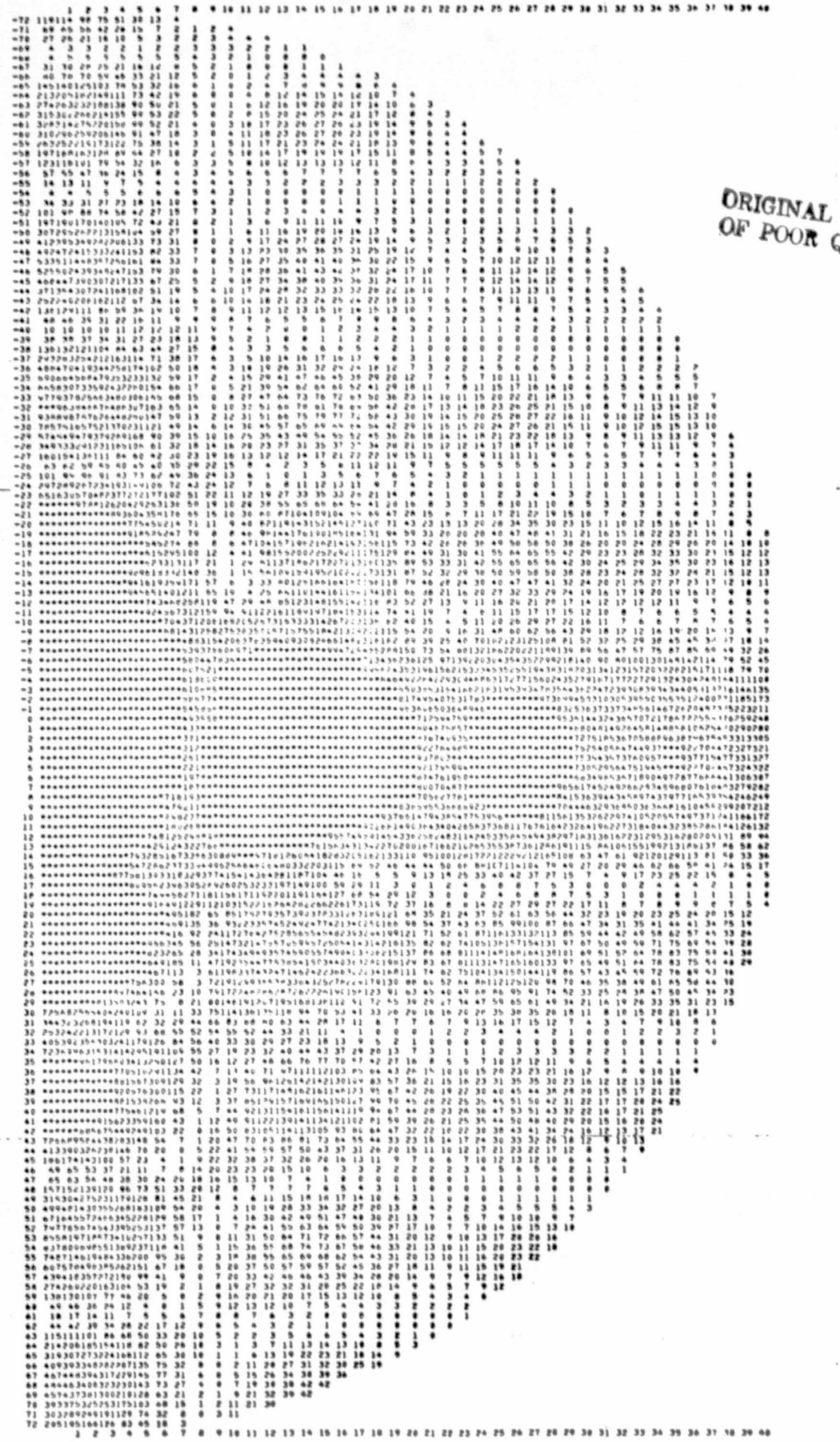
IRRADIANCE ON THE FOCAL PLANE,100000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.924-MICRONS

VERTICAL SCALE 1-INCH= 10.591-MICRONS

FREE APERTURE

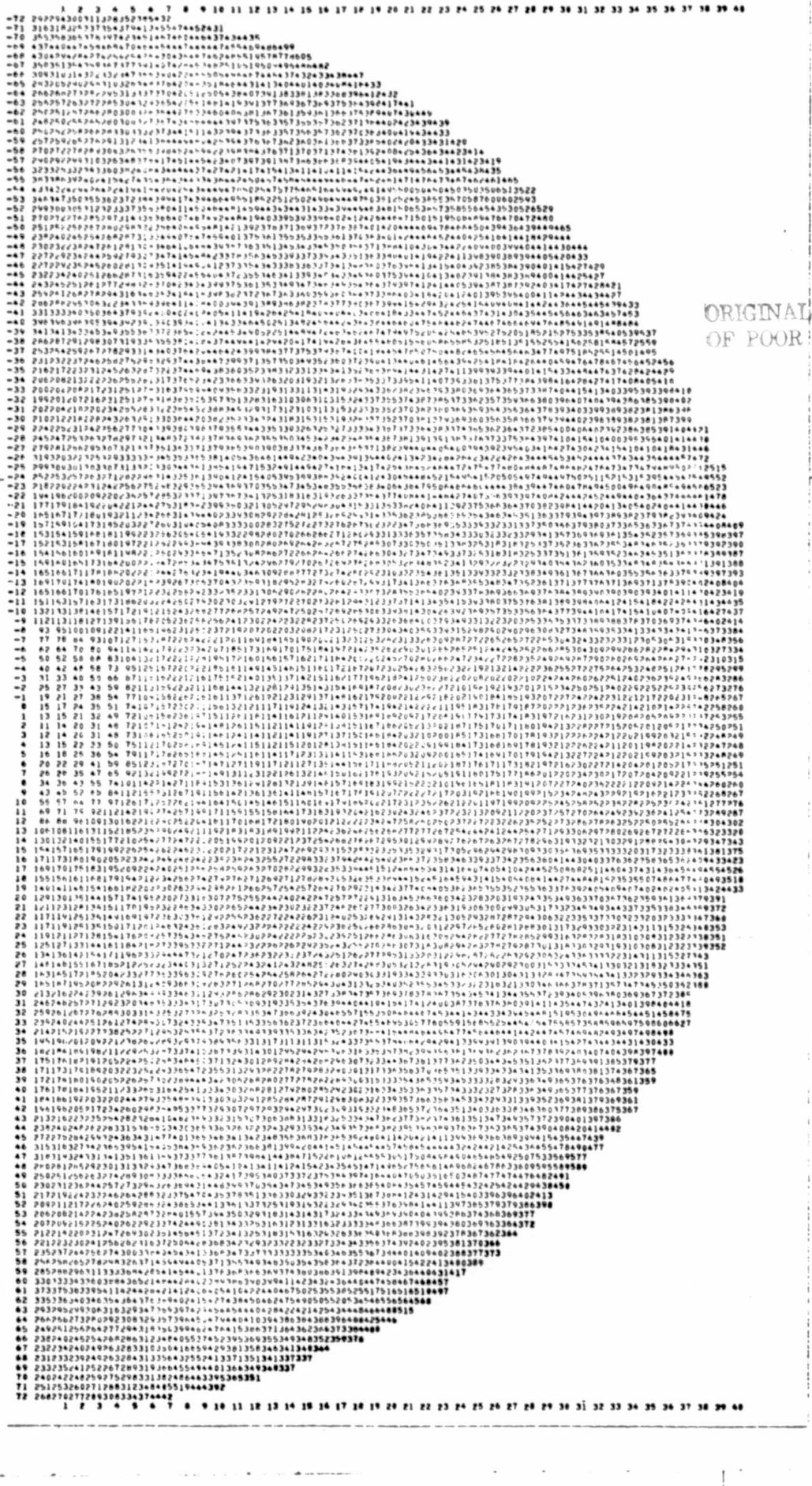


IRRADIANCE ON THE FOCAL PLANE, 0=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.924-MICRONS

VERTICAL SCALE 1-INCH= 10.591-MICRONS

FREE APERTURE



Field point #1, $r_o - r_c = 1.0$

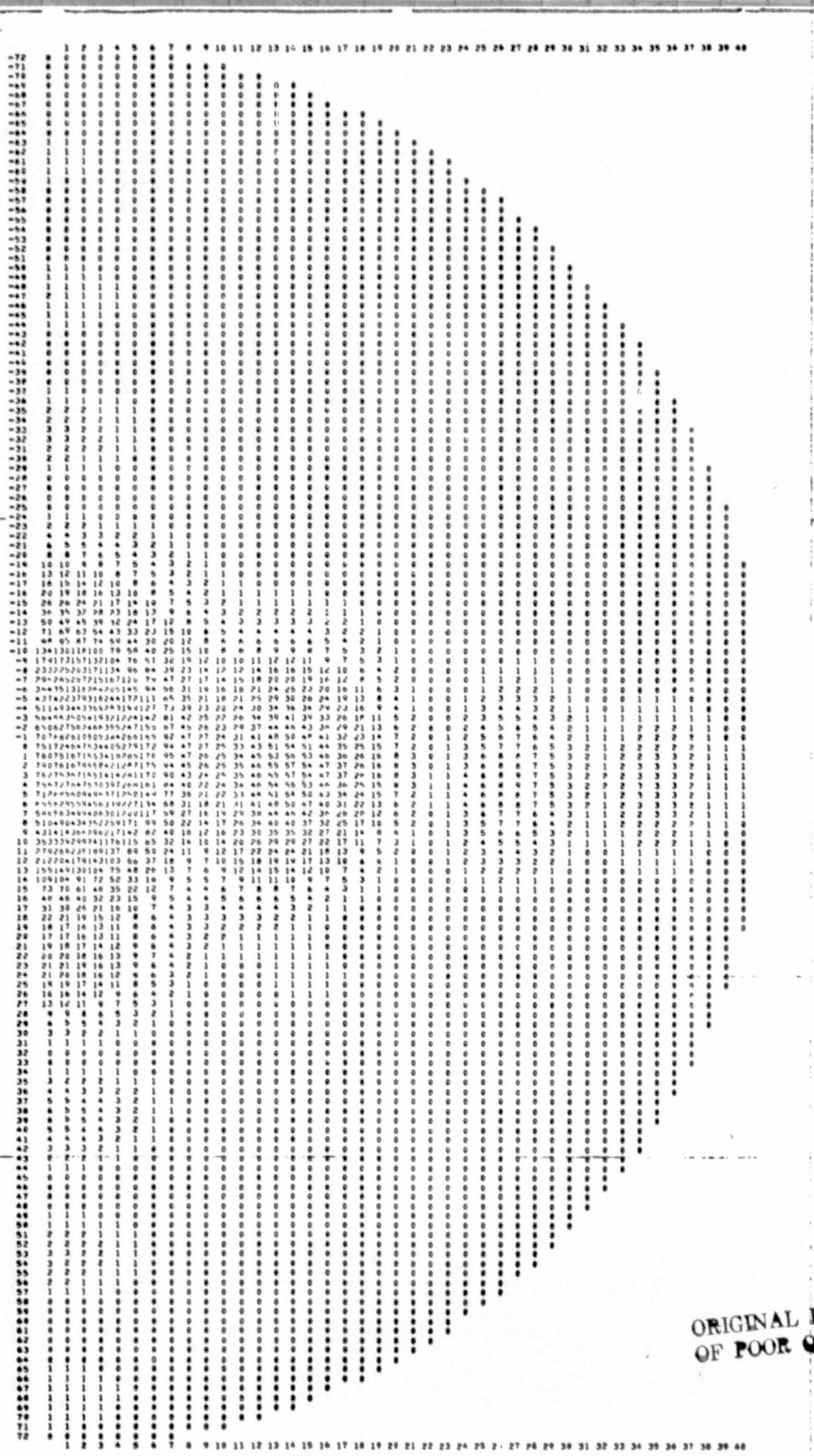
$\cos^2$ weighted aperture

IRRADIANCE ON THE FOCAL PLANE, 1000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.924-MICRONS

VERTICAL SCALE 1-INCH= 10.591-MICRONS

.207FILTER TRANSMITTANCE AT EDGE OF APERTURE

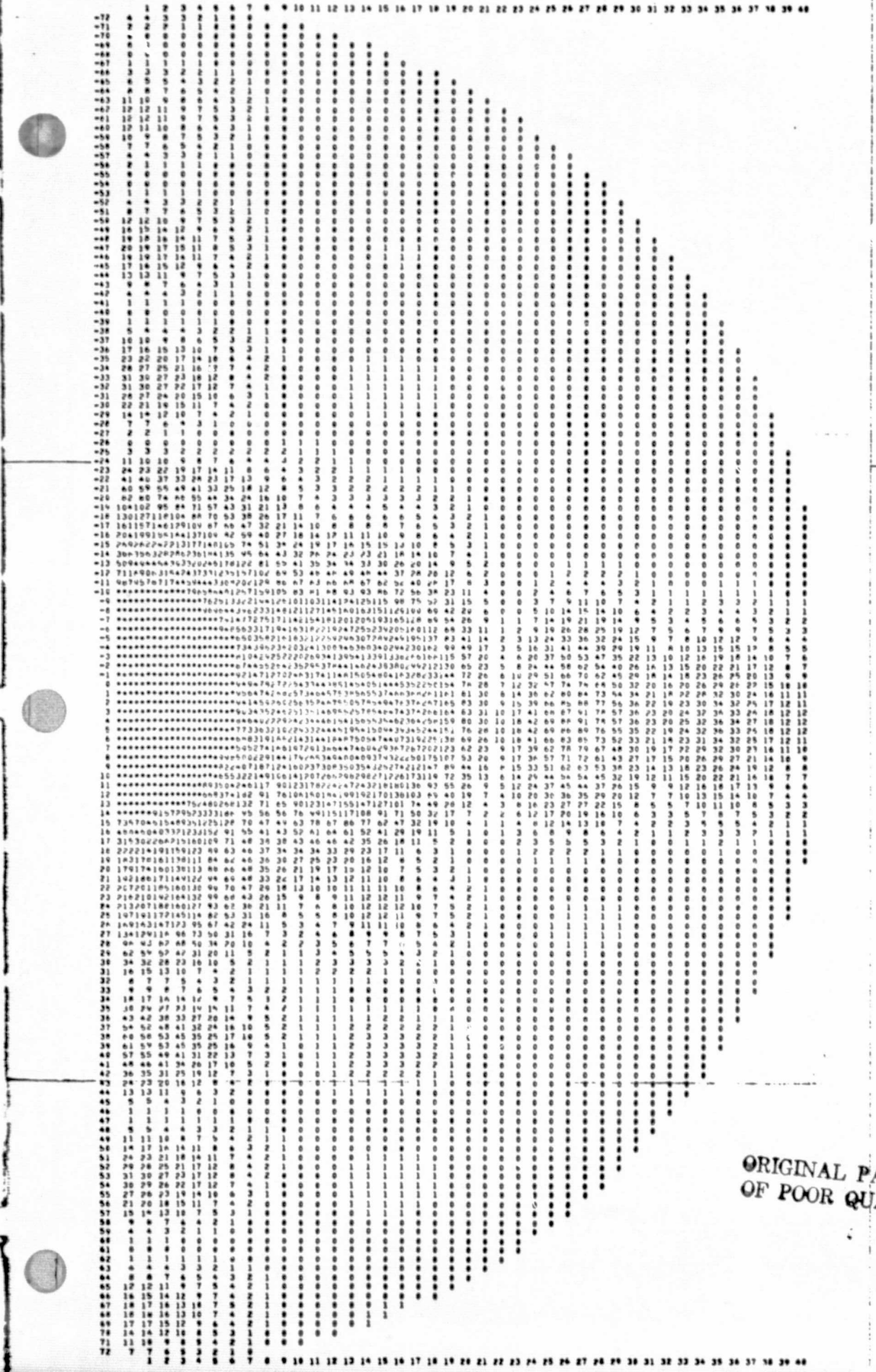


IRRADIANCE ON THE FOCAL PLANE, 10000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.924-MICRONS

VERTICAL SCALE 1-INCH= 10.591-MICRONS

.207FILTER TRANSMITTANCE AT EDGE OF APERTURE



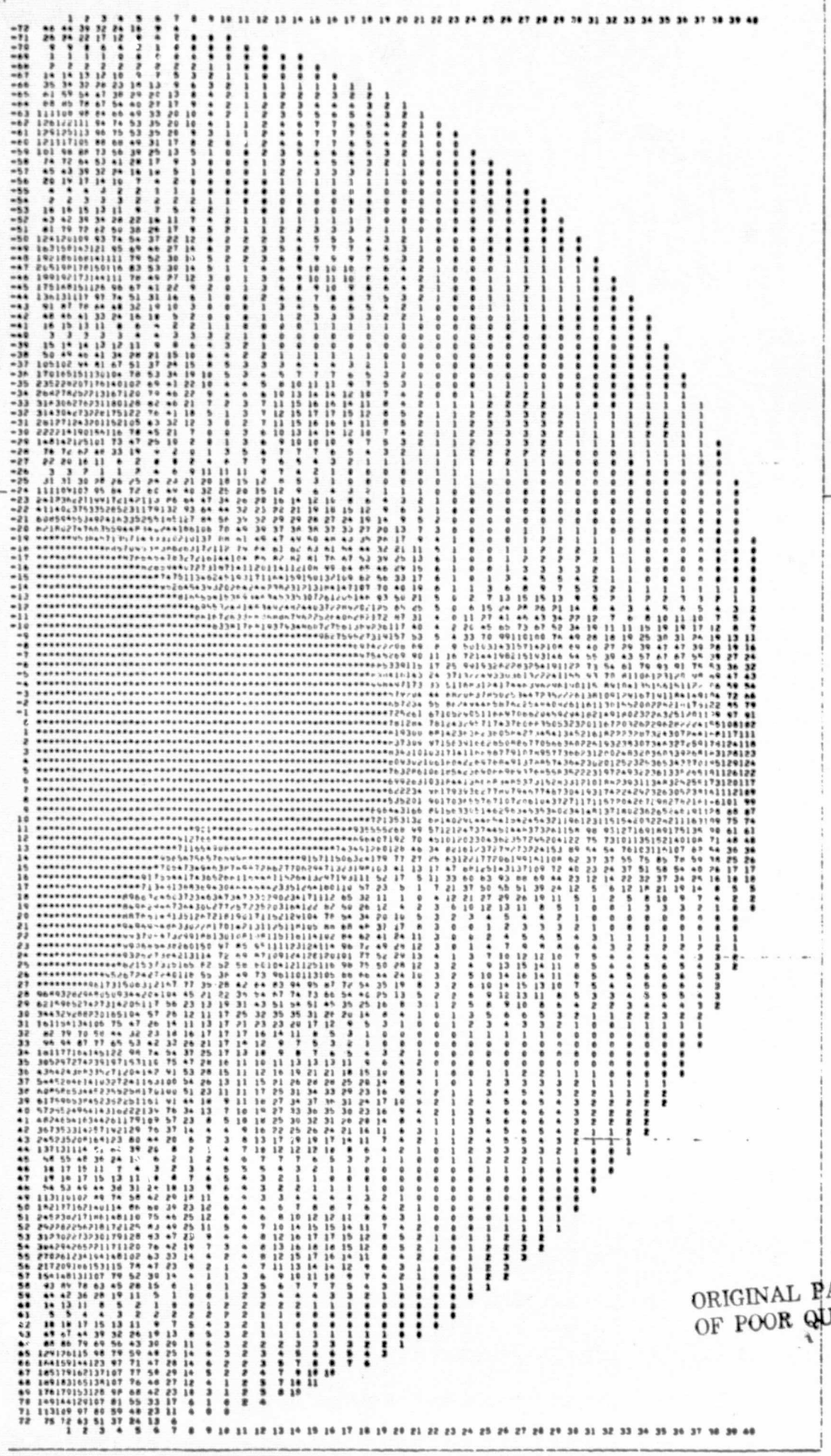
ORIGINAL PAGE IS
OF POOR QUALITY

IRRADIANCE ON THE FOCAL PLANE,100000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.924-MICRONS

VERTICAL SCALE 1-INCH= 10.591-MICRONS

.207FILTER TRANSMITTANCE AT EDGE OF APERTURE

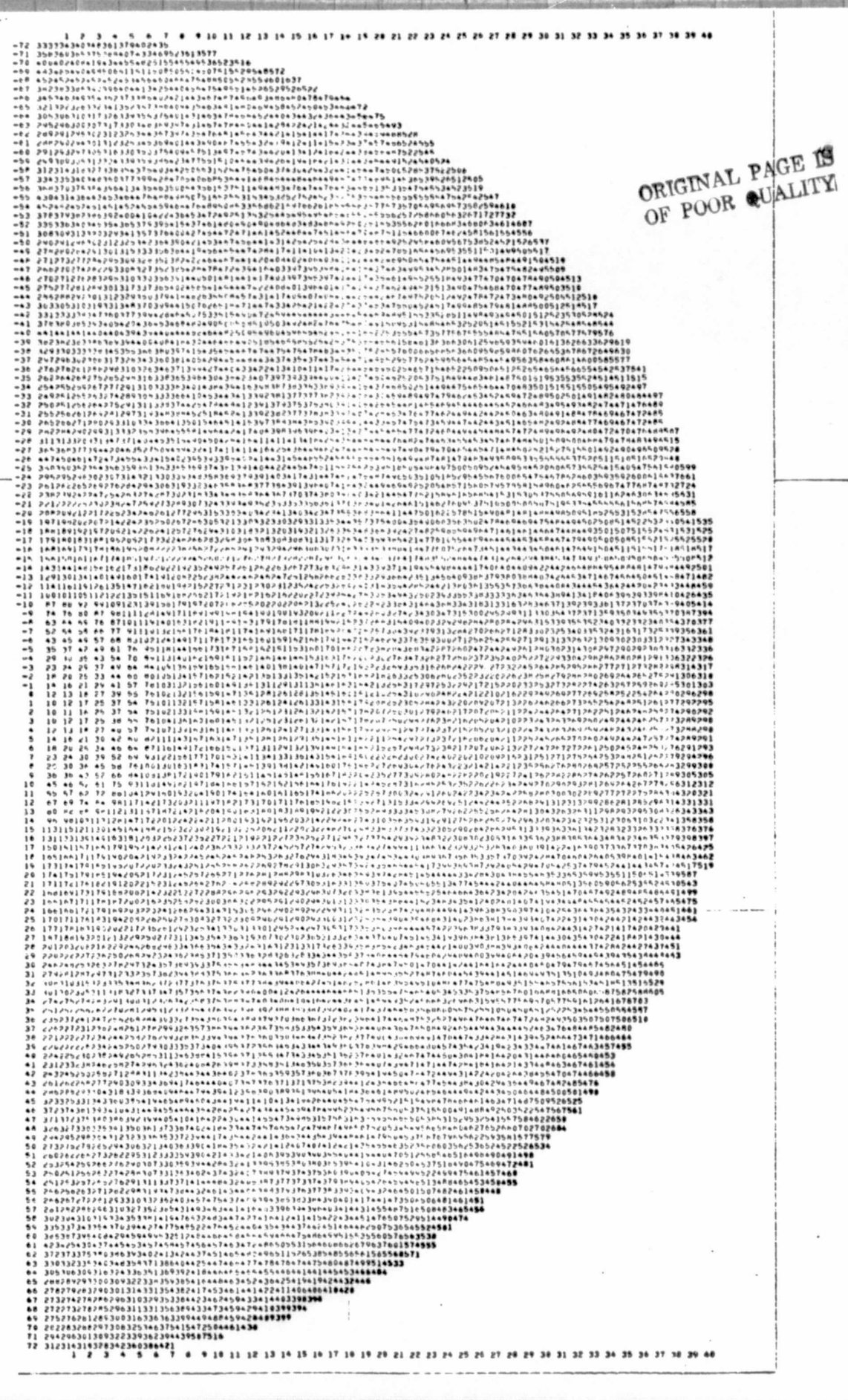


IRRADIANCE ON THE FOCAL PLANE, 0=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.924-MICRONS

VERTICAL SCALE 1-INCH= 10.591-MICRONS

.207FILTER TRANSMITTANCE AT EDGE OF APERTURE



Field point #2, $r_o - r_c = -1.0$

Free aperture

DESIGN NO.64325G, JPL CORRELATOR, RANGE CURVATURE CORRECTOR, SHIFT AND AUXILIARY LENSES 103177- 0

FIELD POINT NO. 2 -1.000000=H(Y) 0.000000=H(Z) 0.000000=G(Y) 1.000000=E(Y) .985081=E(Z)

.943092=HPR(Y) 0.000000=HPR(Z) .012446=NA(Y) -.044782=NA(Z)

.6328=REFERENCE FOCUS WAVELENGTH .6328=RAY TRACING WAVELENGTH

400 RAYS THROUGH ENTRANCE PUPIL 400 RAYS THROUGH EXIT PUPIL 0 VIGNETTED RAYS

WAVE ABERRATION (WAVELENGTH UNITS)

.19	.02	-.08	-.13	-.15	-.14	-.12	-.10	-.08	-.07	-.07	-.08	-.10	-.12	-.14	-.15	-.13	-.08	.02	.19
.20	.02	-.07	-.12	-.13	-.12	-.10	-.08	-.06	-.05	-.05	-.06	-.08	-.10	-.12	-.13	-.12	-.07	.02	.20
.19	.02	-.07	-.12	-.13	-.11	-.09	-.07	-.05	-.03	-.03	-.05	-.07	-.09	-.11	-.13	-.12	-.07	.02	.19
.19	.03	-.07	-.11	-.12	-.11	-.08	-.06	-.04	-.02	-.02	-.04	-.06	-.08	-.11	-.12	-.11	-.07	.03	.19
.18	.02	-.07	-.11	-.11	-.10	-.07	-.05	-.03	-.02	-.02	-.03	-.05	-.07	-.10	-.11	-.11	-.07	.02	.18
.18	.02	-.07	-.11	-.11	-.10	-.07	-.04	-.02	-.01	-.01	-.02	-.04	-.07	-.10	-.11	-.11	-.07	.02	.18
.17	.02	-.07	-.11	-.11	-.09	-.07	-.04	-.02	-.01	-.01	-.02	-.04	-.07	-.09	-.11	-.11	-.07	.02	.17
.17	.02	-.07	-.11	-.11	-.09	-.07	-.04	-.02	-.01	-.01	-.02	-.04	-.07	-.09	-.11	-.11	-.07	.02	.17
.17	.02	-.07	-.10	-.11	-.09	-.06	-.04	-.01	-.00	-.00	-.01	-.04	-.06	-.09	-.11	-.10	-.07	.02	.17
.18	.02	-.07	-.10	-.11	-.09	-.06	-.04	-.01	-.00	-.00	-.01	-.04	-.06	-.09	-.11	-.10	-.07	.02	.18
.18	.03	-.06	-.10	-.11	-.09	-.06	-.03	-.01	-.00	-.00	-.01	-.03	-.06	-.09	-.11	-.10	-.06	.03	.18
.18	.02	-.06	-.10	-.10	-.09	-.06	-.03	-.01	.00	.00	-.01	-.03	-.06	-.09	-.10	-.10	-.06	.02	.18
.19	.04	-.05	-.09	-.10	-.08	-.06	-.03	-.01	.00	.00	-.01	-.03	-.06	-.08	-.10	-.09	-.05	.04	.19
.21	.05	-.04	-.08	-.09	-.07	-.05	-.02	-.01	.01	.01	-.01	-.02	-.05	-.07	-.09	-.08	-.04	.05	.21
.23	.07	-.02	-.06	-.08	-.06	-.04	-.02	.00	.01	.01	.00	-.02	-.04	-.06	-.08	-.06	-.02	.07	.23
.26	.09	-.00	-.05	-.06	-.05	-.03	-.00	.01	.03	.03	.01	-.00	-.03	-.05	-.06	-.05	-.00	.09	.26
.28	.12	.02	-.03	-.04	-.03	-.02	.01	.03	.04	.04	.03	.01	-.02	-.03	-.04	-.03	.02	.12	.28
.32	.15	.05	-.00	-.02	-.01	.00	.03	.04	.05	.05	.04	.03	.00	-.01	-.02	-.00	.05	.15	.32
.37	.19	.09	.03	.01	.02	.03	.05	.07	.08	.08	.07	.05	.03	.02	.01	.03	.09	.19	.37
.43	.24	.13	.07	.05	.05	.06	.08	.09	.10	.10	.09	.08	.06	.05	.05	.07	.13	.24	.43

SQUARED-COSINE WEIGHTED APERTURE

FILTER WEIGHTS (AMPLITUDE RATIO)

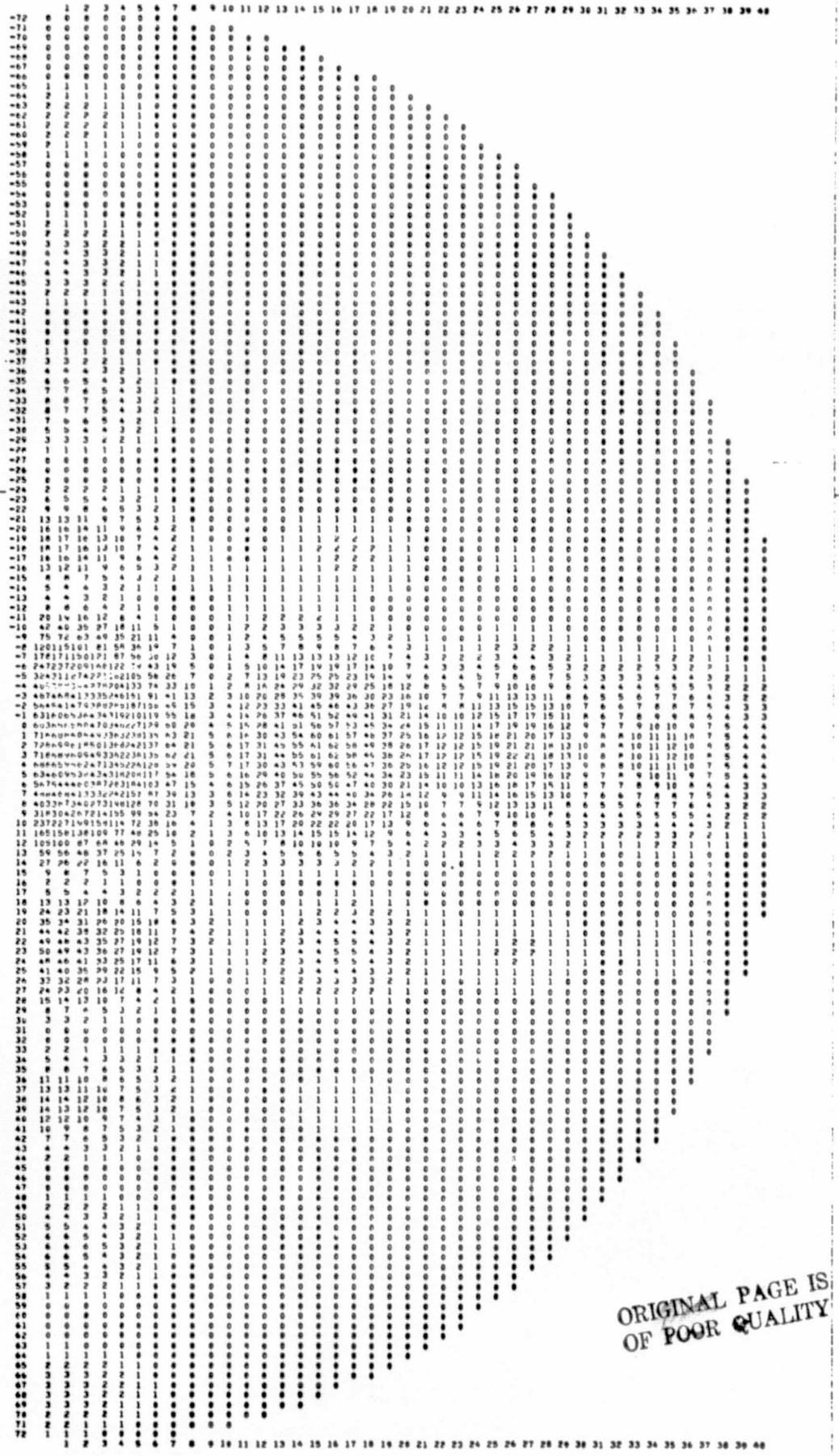
.21	.22	.25	.28	.31	.35	.39	.42	.44	.46	.46	.44	.42	.39	.35	.31	.28	.25	.22	.21
.22	.23	.26	.29	.33	.37	.41	.45	.47	.48	.48	.47	.45	.41	.37	.33	.29	.26	.23	.22
.25	.26	.29	.32	.37	.41	.46	.49	.52	.53	.53	.52	.49	.46	.41	.37	.32	.29	.26	.25
.28	.29	.32	.36	.41	.46	.51	.56	.59	.60	.60	.59	.56	.51	.46	.41	.36	.32	.29	.28
.31	.33	.37	.41	.47	.53	.58	.63	.66	.68	.68	.66	.63	.58	.53	.47	.41	.37	.33	.31
.35	.37	.41	.46	.53	.59	.66	.71	.75	.77	.77	.75	.71	.66	.59	.53	.46	.41	.37	.35
.39	.41	.46	.51	.58	.66	.72	.78	.83	.85	.85	.83	.78	.72	.66	.58	.51	.46	.41	.39
.42	.45	.49	.56	.63	.71	.78	.85	.89	.92	.92	.89	.85	.78	.71	.63	.56	.49	.45	.42
.44	.47	.52	.59	.66	.75	.83	.89	.94	.97	.97	.94	.89	.83	.75	.66	.59	.52	.47	.44
.46	.48	.53	.60	.68	.77	.85	.92	.97	.99	.99	.97	.92	.85	.77	.68	.60	.53	.48	.46
.46	.48	.53	.60	.68	.77	.85	.92	.97	.99	.99	.97	.92	.85	.77	.68	.60	.53	.48	.46
.44	.47	.52	.59	.66	.75	.83	.89	.94	.97	.97	.94	.89	.83	.75	.66	.59	.52	.47	.44
.42	.45	.49	.56	.63	.71	.78	.85	.89	.92	.92	.89	.85	.78	.71	.63	.56	.49	.45	.42
.39	.41	.46	.51	.58	.66	.72	.78	.83	.85	.85	.83	.78	.72	.66	.58	.51	.46	.41	.39
.35	.37	.41	.46	.53	.59	.66	.71	.75	.77	.77	.75	.71	.66	.59	.53	.46	.41	.37	.35
.31	.33	.37	.41	.47	.53	.58	.63	.66	.68	.68	.66	.63	.58	.53	.47	.41	.37	.33	.31
.28	.29	.32	.36	.41	.46	.51	.56	.59	.60	.60	.59	.56	.51	.46	.41	.36	.32	.29	.28
.25	.26	.29	.32	.37	.41	.46	.49	.52	.53	.53	.52	.49	.46	.41	.37	.32	.29	.26	.25
.22	.23	.26	.29	.33	.37	.41	.45	.47	.48	.48	.47	.45	.41	.37	.33	.29	.26	.23	.22
.21	.22	.25	.28	.31	.35	.39	.42	.44	.46	.46	.44	.42	.39	.35	.31	.28	.25	.22	.21

IRRADIANCE ON THE FOCAL PLANE, 1000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.943-MICRONS

VERTICAL SCALE 1-INCH= 10.591-MICRONS

FREE APERTURE



IRRADIANCE ON THE FOCAL PLANE, 10000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.943-MICRONS

VERTICAL SCALE 1-INCH= 10.591-MICRONS

FREE APERTURE

IRRADIANCE ON THE FOCAL PLANE,100000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.943-MICRONS

VERTICAL SCALE 1-INCH= 10.591-MICRONS

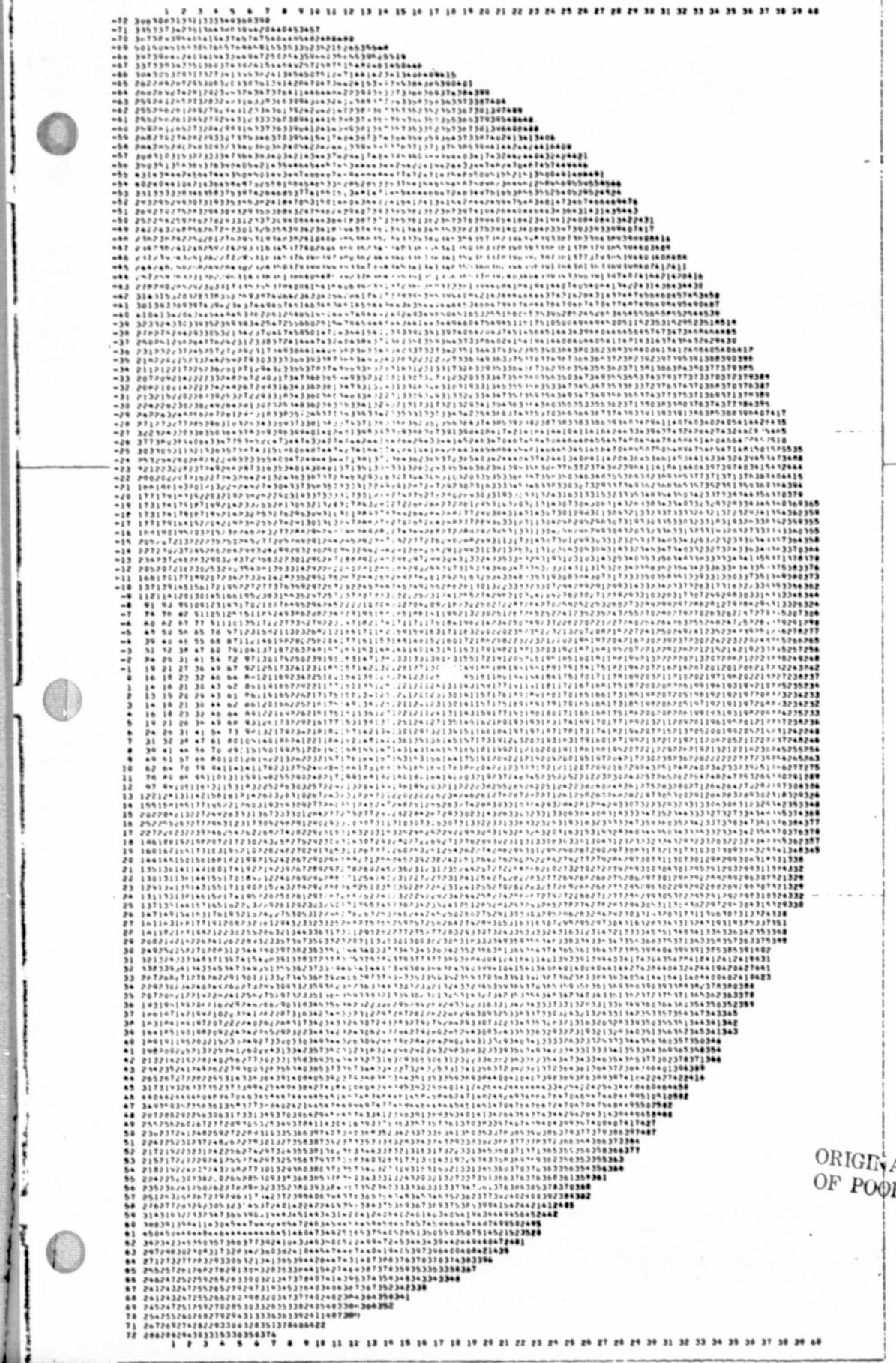
FREE APERTURE

IRRADIANCE ON THE FOCAL PLANE, 0=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.943-MICRONS

VERTICAL SCALE 1-INCH= 10.591-MICRONS

FREE APERTURE



Field point #2, $r_o - r_c = -1.0$

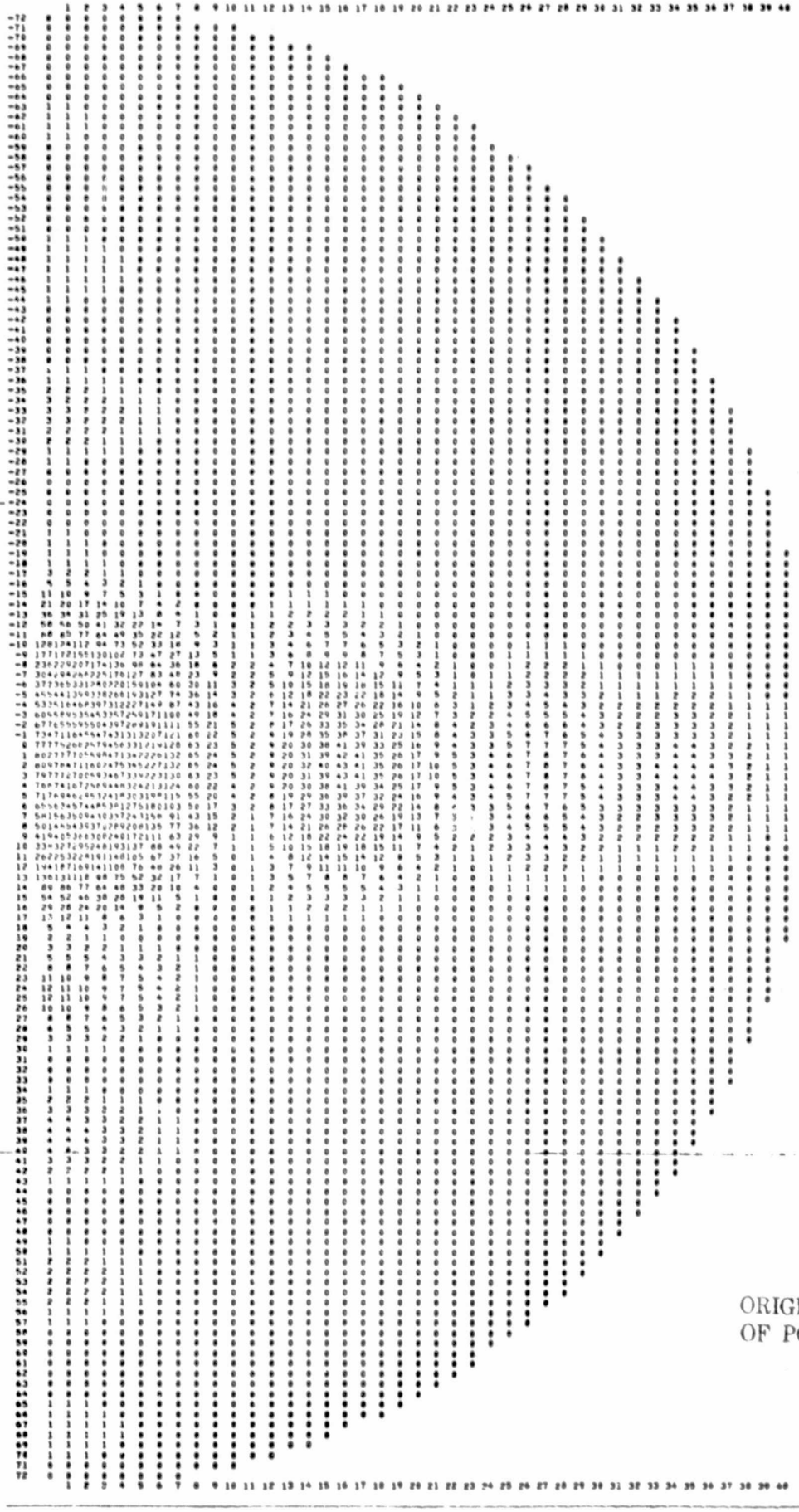
$\cos^2$ weighted aperture

IRRADIANCE ON THE FOCAL PLANE, 1000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.943-MICRONS

VERTICAL SCALE 1-INCH= 10.591-MICRONS

.207FILTER TRANSMITTANCE AT EDGE OF APERTURE

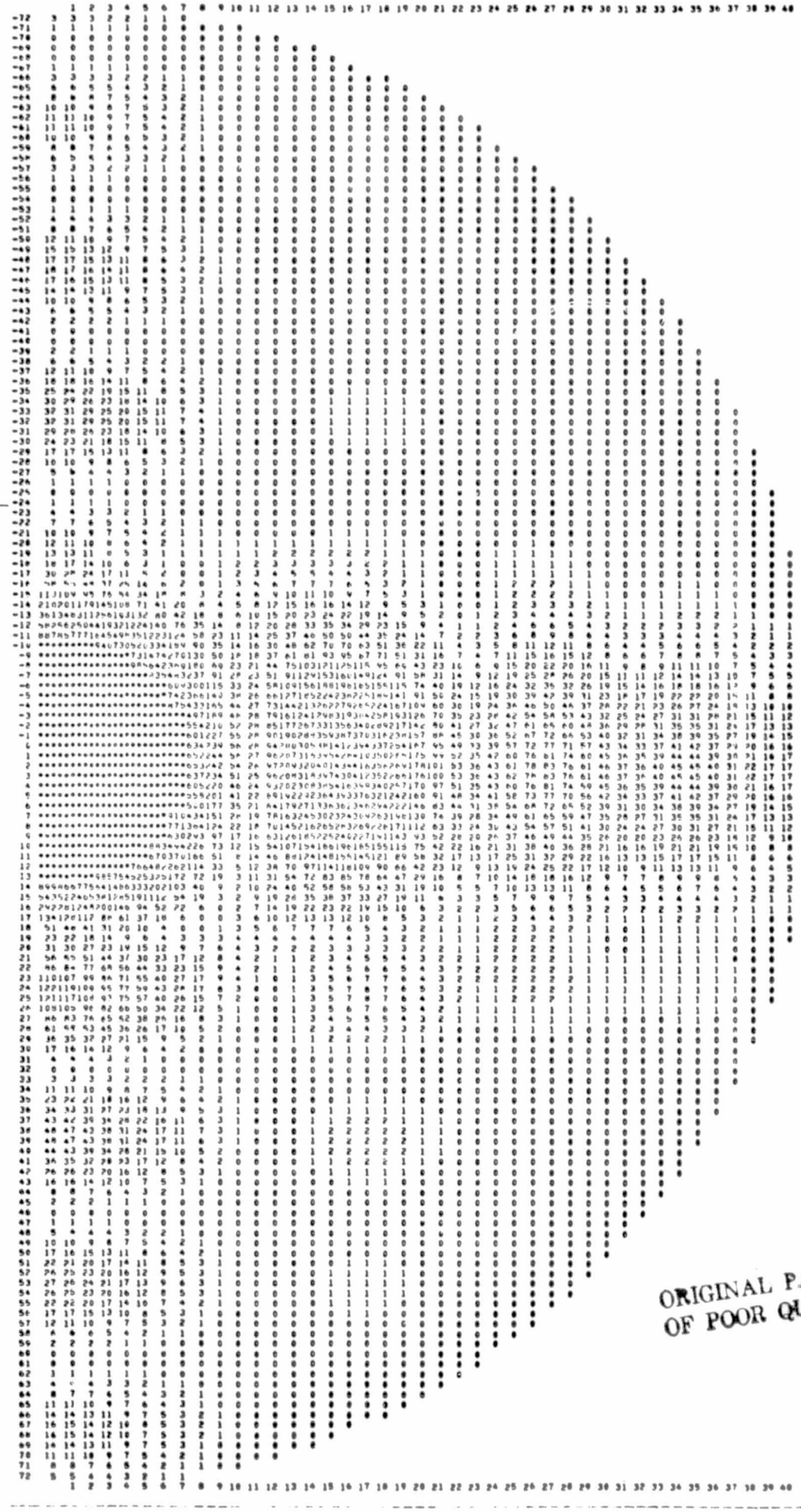


IRRADIANCE ON THE FOCAL PLANE, 10000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.943-MICRONS

VERTICAL SCALE 1-INCH= 10.591-MICRONS

.207FILTER TRANSMITTANCE AT EDGE OF APERTURE



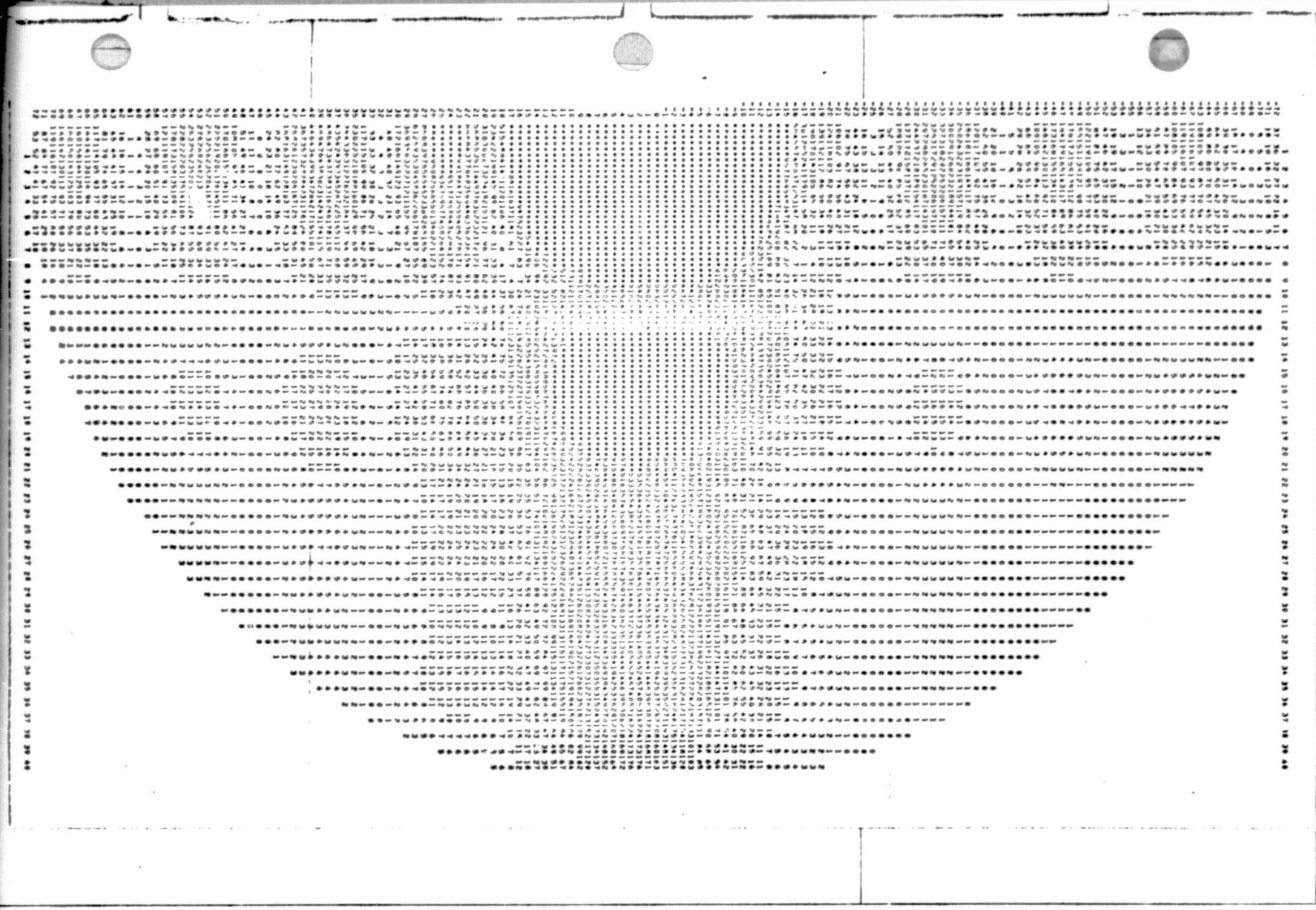
ORIGINAL PAGE IS
OF POOR QUALITY

IRRADIANCE ON THE FOCAL PLANE,1[illegible]00=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.943-MICRONS

VERTICAL SCALE 1-INCH= 10.591-MICRONS

.207FILTER TRANSMITTANCE AT EDGE OF APERTURE

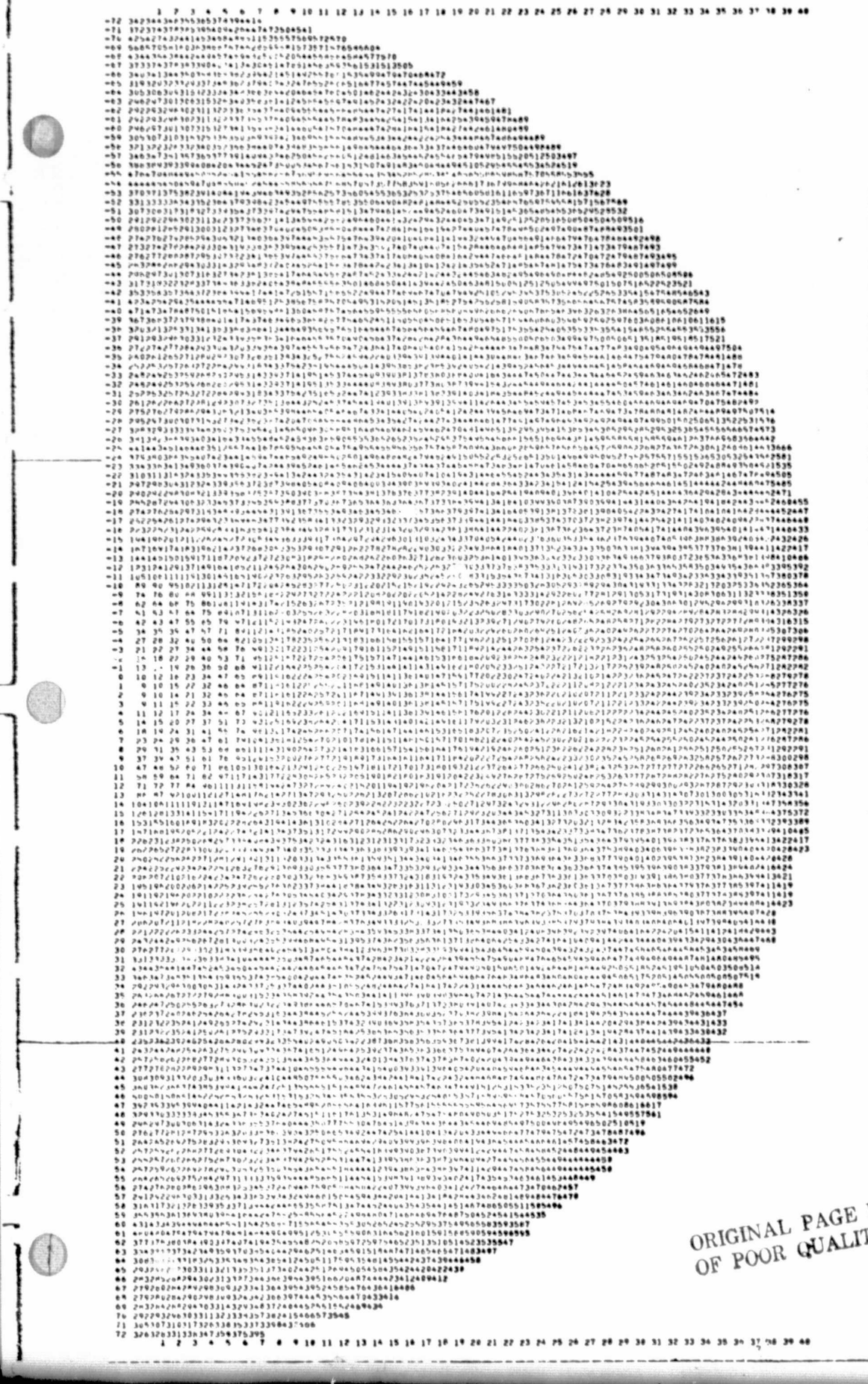


IRRADIANCE ON THE FOCAL PLANE, 0=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.943-MICRONS

VERTICAL SCALE 1-INCH= 10.591-MICRONS

.207FILTER TRANSMITTANCE AT EDGE OF APERTURE



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OF POOR QUALITY

Phase I

DESIGN NO.64325IX, JPL CORRELATOR, RCC, SHIFT LENS, DUMMY AZIMUTH TELESCOPE. 032377-347

****

2 -2 1 .332500=PM(1) 0.000000=SIN UM(1) 1.000000=HP(1) 0.000000=TAN UP(1)

2 -2 1 1.650000=PM(2) 0.000000=SIN UM(2) 0.000000=HP(2) 0.000000=TAN UP(2)

.63280 .48610 .65630 25.4MM=UNIT OF LENGTH

		RADIUS,ETC	AXL.DSTNCE	M-INDEX	L-INDEX	U-INDEX	GLASS CODE,NAME	1ST.CA	2ND.CA	STATION
			0.0000	1.00000	1.00000	1.00000		0.00	0.00	130.7153
1	RTN	-.0053	0.0000	1.00000	1.00000	1.00000	0.000	0.00	0.00	130.7153
2	TRN	-5.4900	0.0000	1.00000	1.00000	1.00000	0.000	0.00	0.00	130.7153
3	RPH *********	.0000	0.0000	1.00000	1.00000	1.00000	-.056 XXXXXX	0.00	0.00	130.7153
4	TRN	5.4900	18.0000	1.00000	1.00000	1.00000	0.000	0.00	0.00	130.7153
5	SPH	-10.4469	1.8839	1.74969	1.77469	1.74729	755.276 SF4	0.00	0.00	112.7153
6	SPH	-13.4336	.0307	1.00000	1.00000	1.00000	0.000	0.00	0.00	110.8314
7	SPH	31.1330	1.3652	1.74969	1.77469	1.74729	755.276 SF4	0.00	0.00	110.8007
8	SPH	-24.5830	5.5793	1.00000	1.00000	1.00000	0.000	0.00	0.00	109.4355
9	SPH	-14.9126	1.3477	1.50671	1.51423	1.50592	508.612 ZKN7	0.00	0.00	103.8562
10	SPH	15.8548	3.6306	1.00000	1.00000	1.00000	0.000	0.00	0.00	102.5085
11	SPH	24.5464	1.3652	1.74969	1.77469	1.74729	755.276 SF4	0.00	0.00	98.8779
12	SPH	-34.5304	3.5303	1.00000	1.00000	1.00000	0.000	0.00	0.00	97.5127
13	SPH	13.1420	1.8553	1.74969	1.77469	1.74729	755.276 SF4	0.00	0.00	93.9824
14	SPH	10.5330	16.0000	1.00000	1.00000	1.00000	0.000	0.00	0.00	92.1271
15	RTN	-.0587	-.1653	1.00000	1.00000	1.00000	0.000	0.00	0.00	76.1271
16	SPH	-6.6582	.3305	1.79683	1.82776	1.79609	805.254 SF6	0.00	0.00	76.2923
17	CYL	-6.6582	-.1653	1.00000	1.00000	1.00000	0.000	0.00	0.00	75.9618
18	RTN	.0587	1.2919	1.00000	1.00000	1.00000	0.000	0.00	0.00	76.1271
19	RTN	.0587	-.1630	1.00000	1.00000	1.00000	0.000	0.00	0.00	74.8352
20	CYL	-7.3958	.3260	1.79683	1.82776	1.79609	805.254 SF6	0.00	0.00	74.9982
21	SPH	-7.7230	-.1630	1.00000	1.00000	1.00000	0.000	0.00	0.00	74.6722
22	RTN	-.0587	1.2522	1.00000	1.00000	1.00000	0.000	0.00	0.00	74.8352
23	RTN	-.0223	0.0000	1.00000	1.00000	1.00000	0.000	0.00	0.00	73.5830

24 CYL	5.6253	.2500	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	73.5830
25 SPH	30.3365	0.0000	1.00000	1.00000	1.00000	0.000		0.00	0.00	73.3330
26 RTN	.0223	17.9790	1.00000	1.00000	1.00000	0.000		0.00	0.00	73.3330
27 SPH	-10.5330	1.8553	1.74969	1.77469	1.74729	755.276	SF4	0.00	0.00	55.3540
28 SPH	-13.1420	3.5303	1.00000	1.00000	1.00000	0.000		0.00	0.00	53.4987
29 SPH	34.5304	1.3652	1.74969	1.77469	1.74729	755.276	SF4	0.00	0.00	49.9684
30 SPH	-24.5464	3.6303	1.00000	1.00000	1.00000	0.000		0.00	0.00	48.6032
31 SPH	-15.8548	1.3477	1.50671	1.51423	1.50592	508.612	ZKN7	0.00	0.00	44.9729
32 SPH	14.9126	5.5793	1.00000	1.00000	1.00000	0.000		0.00	0.00	43.6252
33 SPH	24.5830	1.3652	1.74969	1.77469	1.74729	755.276	SF4	0.00	0.00	38.0459
34 SPH	-31.1330	.0307	1.00000	1.00000	1.00000	0.000		0.00	0.00	36.6807
35 SPH	13.4336	1.8639	1.74969	1.77469	1.74729	755.276	SF4	0.00	0.00	36.6500
36 SPH	10.4469	17.2604	1.00000	1.00000	1.00000	0.000		0.00	0.00	34.7661
37 CYL	4.7640	.6500	1.75759	1.77722	1.75566	.028	XXXXXX	0.00	0.00	17.5057
38 CYL	-4.4429	0.0000	1.00000	1.00000	1.00000	0.000		0.00	0.00	16.8557
39 CYL	-3.6353	0.0000	1.61868	1.63477	1.61711	.029	XXXXXX	0.00	0.00	16.8557
40 CYL	28.9570	8.3670	1.00000	1.00000	1.00000	0.000		0.00	0.00	16.8557
41 CYL	3.3555	.1750	1.79553	1.82462	1.79308	.040	XXXXXX	0.00	0.00	8.4886
42 CYL	-2.1443	5.7336	1.00000	1.00000	1.00000	0.000		0.00	0.00	8.3136
43 RTN	.0761	0.0000	1.00000	1.00000	1.00000	0.000		0.00	0.00	2.5800
44 CYL	INFINITE	.4000	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	2.5800
45 CYL	-1.2000	0.0000	1.00000	1.00000	1.00000	0.000		0.00	0.00	2.1800
46 RTN	-.0761	.5000	1.00000	1.00000	1.00000	0.000		0.00	0.00	2.1800
47 CYL	1.2000	.4000	1.79883	1.82776	1.79609	805.254	SF6	0.00	0.00	1.6800
48 CYL	INFINITE	1.2600	1.00000	1.00000	1.00000	0.000		0.00	0.00	1.2800
49 SPH	INFINITE	-.0226	1.00000	1.00000	1.00000	0.000		0.00	0.00	-.0000

TABLE OF CONSTANTS

3	4.069600E+05	3.906200E-01	-4.557300E+03	1.106000E+02	6.563200E+03

FIRST ORDER PARAMETERS ON MERIDIONAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
-27.670022	999999.999996	999999.999996	999999.999996	372250.382545	182913.015351	1.254943
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
1.000000	999999.999996	41.609055	-20.445409	-40.196955	4550.388522	-.966063
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
-.966063	0.000000	130.690195	129.435252	-157.105274	.000303	-1.035130
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM SRFCE.NO
0.000000	1.248490	22.000000	158.360217	1.932125	1.254943	48.000000

FIRST ORDER PARAMETERS ON EQUATORIAL PLANE

OBJECT DSTNCE	ENTR.PUP.DIST	FRST.PPAL.PNT	EQV.FCL.LNGTH	SCND.PPAL.PNT	EXT.PUP.DSTNC	IMAGE DISTNCE
175.467238	999999.999996	0.000000	0.000000	0.000000	999999.999996	1.302600
OBJECT HEIGHT	ENTR.PUP.SIZE	OBJT.SPCE.FNO	INF.EQUIV.FNO	IMGE.SPCE.FNO	EXT.PUPL.SIZE	IMAGE HEIGHT
0.000000	999999.999996	-53.171890	9.582985	11.689796	999999.999996	0.000000
MAGNIFICATION	SEMIANG.FIELD	FRNT.VTX.DIST	BARREL LENGTH	BACK VTX.DIST	SEMIANG.FIELD	DEMAGNIFICATN
-.219849	0.000000	130.737852	129.435252	46.031986	0.000000	-4.548673
APT.STOP SIZE	APT.STOP DIST	FROM SRFCE.NO	TRACK LENGTH	FLD.STOP SIZE	FLD.STOP DIST	FROM.SRFCE.NO
0.000000	0.000000	0.000000	-44.729386	0.000000	4.476031	42.000000

Field point #0, $r_o - r_c = 0$

Free aperture

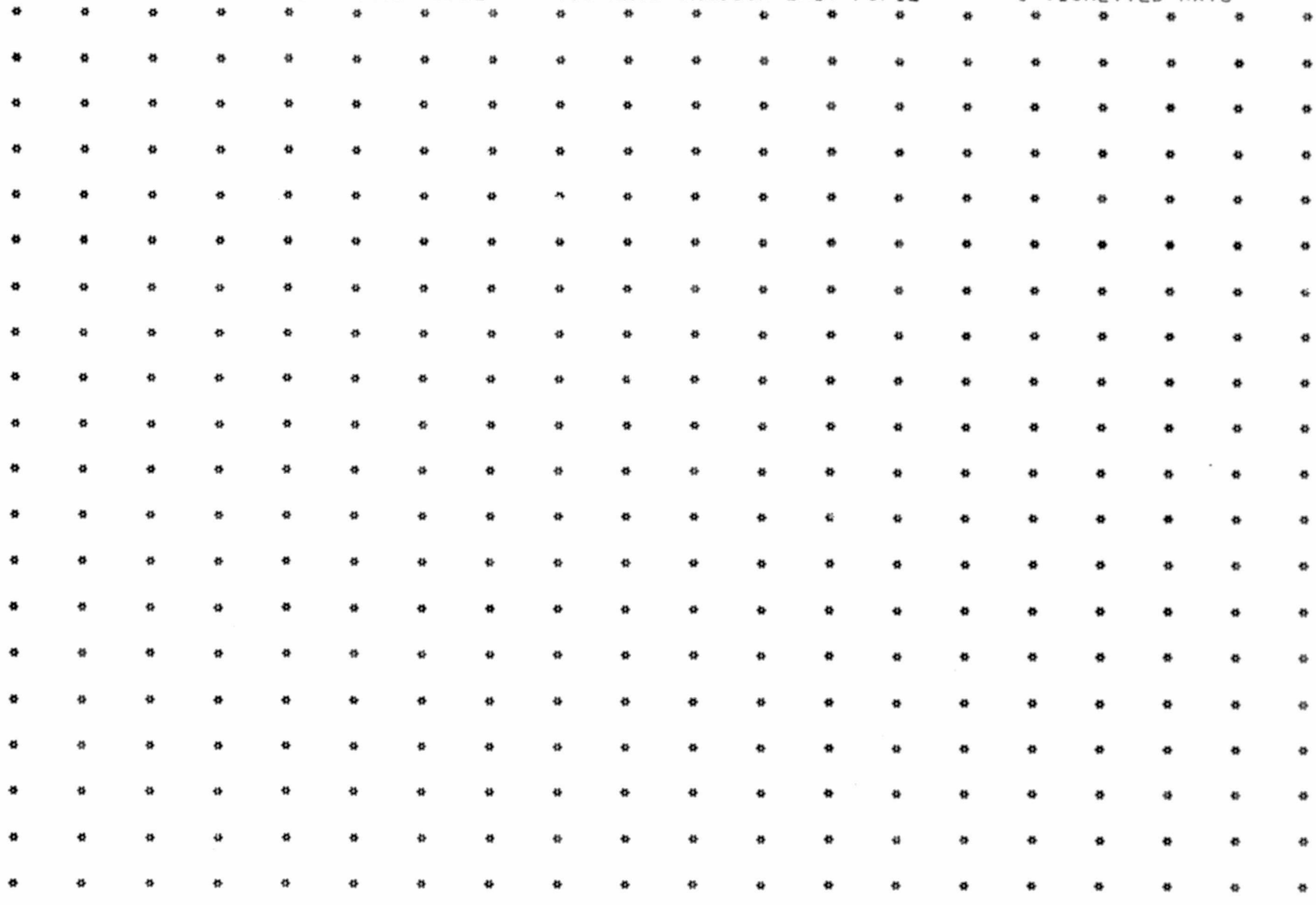
DESIGN NO.6432SIX, JPL CORRELATOR, RCC, SHIFT LENS, DUMMY AZIMUTH TELESCOPE. 032377-347

FIELD POINT NO. 0 0.000000=H(Y) 0.000000=H(Z) 0.000000=G(Y) 1.000000=E(Y) 1.000000=E(Z)

-.073927=HPR(Y) -.000042=HPR(Z) .012496=NA(Y) -.044519=NA(Z)

.6328=REFERENCE FOCUS WAVELENGTH .6328=RAY TRACING WAVELENGTH

400 RAYS THROUGH ENTRANCE PUPIL 400 RAYS THROUGH EXIT PUPIL 0 VIGNETTED RAYS



WAVE ABERRATION (WAVELENGTH UNITS)

.13 -.07 -.19 -.24 -.24 -.21 -.17 -.13 -.10 -.09 -.10 -.13 -.17 -.23 -.29 -.34 -.37 -.37 -.31 -.17

.14 -.06 -.18 -.22 -.22 -.19 -.15 -.11 -.08 -.07 -.07 -.10 -.14 -.20 -.26 -.31 -.34 -.33 -.27 -.13

.15 -.05 -.17 -.21 -.21 -.18 -.14 -.09 -.06 -.05 -.05 -.08 -.12 -.17 -.23 -.28 -.32 -.31 -.24 -.11

.15 -.04 -.16 -.20 -.20 -.17 -.12 -.08 -.05 -.03 -.04 -.06 -.10 -.16 -.21 -.26 -.30 -.29 -.22 -.08

.16 -.04 -.15 -.19 -.19 -.16 -.11 -.07 -.04 -.02 -.02 -.05 -.09 -.14 -.20 -.25 -.28 -.27 -.21 -.07

.16 -.04 -.15 -.19 -.19 -.15 -.11 -.06 -.03 -.01 -.01 -.04 -.08 -.13 -.19 -.24 -.26 -.25 -.19 -.05

.16 -.04 -.15 -.19 -.18 -.15 -.10 -.06 -.03 -.01 -.01 -.03 -.07 -.12 -.18 -.23 -.25 -.24 -.17 -.04

.16 -.04 -.15 -.19 -.18 -.15 -.10 -.06 -.02 -.00 -.00 -.03 -.07 -.12 -.17 -.22 -.24 -.24 -.17 -.03

.16 -.04 -.15 -.19 -.18 -.15 -.10 -.06 -.02 -.00 -.00 -.02 -.06 -.11 -.17 -.22 -.24 -.23 -.16 -.02

.17 -.04 -.14 -.19 -.18 -.15 -.10 -.06 -.02 -.00 -.00 -.02 -.06 -.11 -.16 -.21 -.24 -.22 -.16 -.01

.16 -.03 -.14 -.18 -.18 -.15 -.10 -.06 -.02 -.00 -.00 -.02 -.06 -.11 -.16 -.21 -.24 -.22 -.16 -.01

.17 -.03 -.14 -.18 -.18 -.15 -.10 -.06 -.02 -.00 -.00 -.02 -.06 -.11 -.16 -.21 -.23 -.22 -.15 -.01

.18 -.02 -.13 -.17 -.17 -.14 -.10 -.06 -.02 -.00 -.00 -.02 -.06 -.11 -.16 -.21 -.23 -.22 -.15 -.00

.19 -.00 -.12 -.17 -.17 -.14 -.10 -.05 -.02 -.00 -.00 -.02 -.06 -.11 -.16 -.21 -.23 -.22 -.15 .00

.21 .00 -.11 -.16 -.16 -.13 -.09 -.05 -.01 .00 .00 -.02 -.05 -.10 -.16 -.20 -.23 -.22 -.14 .00

.23 .03 -.09 -.14 -.15 -.12 -.08 -.04 -.01 .01 .01 -.01 -.05 -.10 -.15 -.20 -.22 -.21 -.14 .01

.26 .05 -.07 -.12 -.13 -.11 -.07 -.03 .00 .02 .02 -.01 -.04 -.09 -.15 -.19 -.22 -.20 -.13 .02

.29 .08 -.04 -.10 -.11 -.09 -.05 -.01 .02 .03 .03 .01 -.03 -.08 -.14 -.18 -.21 -.19 -.12 .02

.33 .12 -.01 -.07 -.08 -.06 -.03 .01 .03 .05 .04 .02 -.02 -.07 -.12 -.17 -.20 -.18 -.11 .03

.38 .16 .03 -.03 -.05 -.03 -.00 .03 .06 .07 .06 .04 -.00 -.05 -.11 -.16 -.18 -.17 -.10 .05

SQUARED-COSINE WEIGHTED APERTURE

FILTER WEIGHTS (AMPLITUDE RATIO)

.21	.22	.25	.28	.31	.35	.39	.42	.44	.46	.46	.44	.42	.39	.35	.31	.28	.25	.22	.21
.22	.23	.26	.29	.33	.37	.41	.45	.47	.48	.48	.47	.45	.41	.37	.33	.29	.26	.23	.22
.25	.26	.29	.32	.37	.41	.46	.49	.52	.53	.53	.52	.49	.46	.41	.37	.32	.29	.26	.25
.28	.29	.32	.36	.41	.46	.51	.56	.59	.60	.60	.59	.56	.51	.46	.41	.36	.32	.29	.28
.31	.33	.37	.41	.47	.53	.58	.63	.66	.68	.68	.66	.63	.58	.53	.47	.41	.37	.33	.31
.35	.37	.41	.46	.53	.59	.66	.71	.75	.77	.77	.75	.71	.66	.59	.53	.46	.41	.37	.35
.39	.41	.46	.51	.58	.66	.72	.78	.83	.85	.85	.83	.78	.72	.66	.58	.51	.46	.41	.39
.42	.45	.49	.56	.63	.71	.78	.85	.89	.92	.92	.89	.85	.78	.71	.63	.56	.49	.45	.42
.44	.47	.52	.59	.66	.75	.83	.89	.94	.97	.97	.94	.89	.83	.75	.66	.59	.52	.47	.44
.46	.48	.53	.60	.68	.77	.85	.92	.97	.99	.99	.97	.92	.85	.77	.68	.60	.53	.48	.46
.46	.48	.53	.60	.68	.77	.85	.92	.97	.99	.99	.97	.92	.85	.77	.68	.60	.53	.48	.46
.44	.47	.52	.59	.66	.75	.83	.89	.94	.97	.97	.94	.89	.83	.75	.66	.59	.52	.47	.44
.42	.45	.49	.56	.63	.71	.78	.85	.89	.92	.92	.89	.85	.78	.71	.63	.56	.49	.45	.42
.39	.41	.46	.51	.58	.66	.72	.78	.83	.85	.85	.83	.78	.72	.66	.58	.51	.46	.41	.39
.35	.37	.41	.46	.53	.59	.66	.71	.75	.77	.77	.75	.71	.66	.59	.53	.46	.41	.37	.35
.31	.33	.37	.41	.47	.53	.58	.63	.66	.68	.68	.66	.63	.58	.53	.47	.41	.37	.33	.31
.28	.29	.32	.36	.41	.46	.51	.56	.59	.60	.60	.59	.56	.51	.46	.41	.36	.32	.29	.28
.25	.26	.29	.32	.37	.41	.46	.49	.52	.53	.53	.52	.49	.46	.41	.37	.32	.29	.26	.25
.22	.23	.26	.29	.33	.37	.41	.45	.47	.48	.48	.47	.45	.41	.37	.33	.29	.26	.23	.22
.21	.22	.25	.28	.31	.35	.39	.42	.44	.46	.46	.44	.42	.39	.35	.31	.28	.25	.22	.21

IRRADIANCE ON THE FOCAL PLANE, 1000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.961-MICRONS

VERTICAL SCALE 1-INCH= 10.548-MICRONS

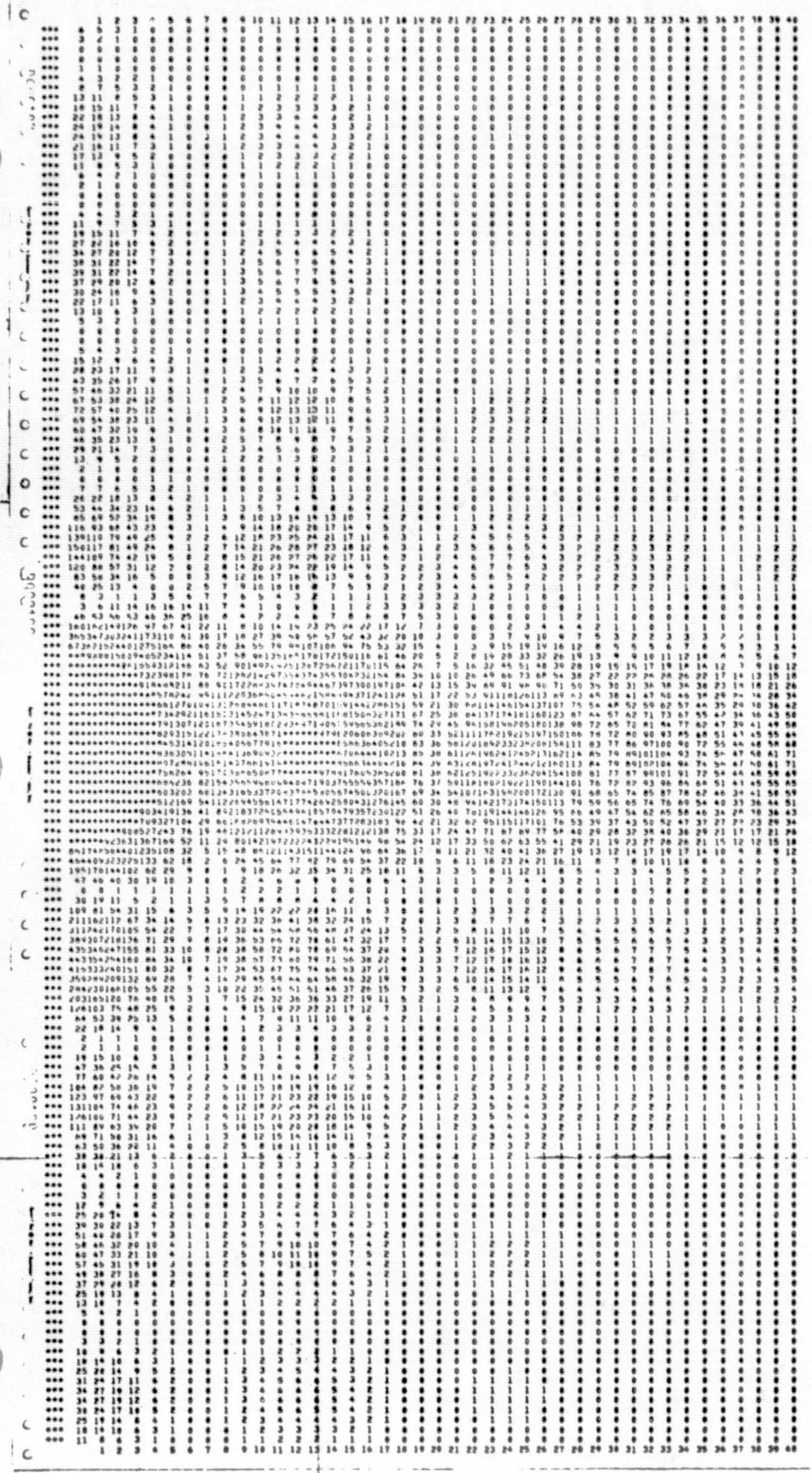
FREE APERTURE

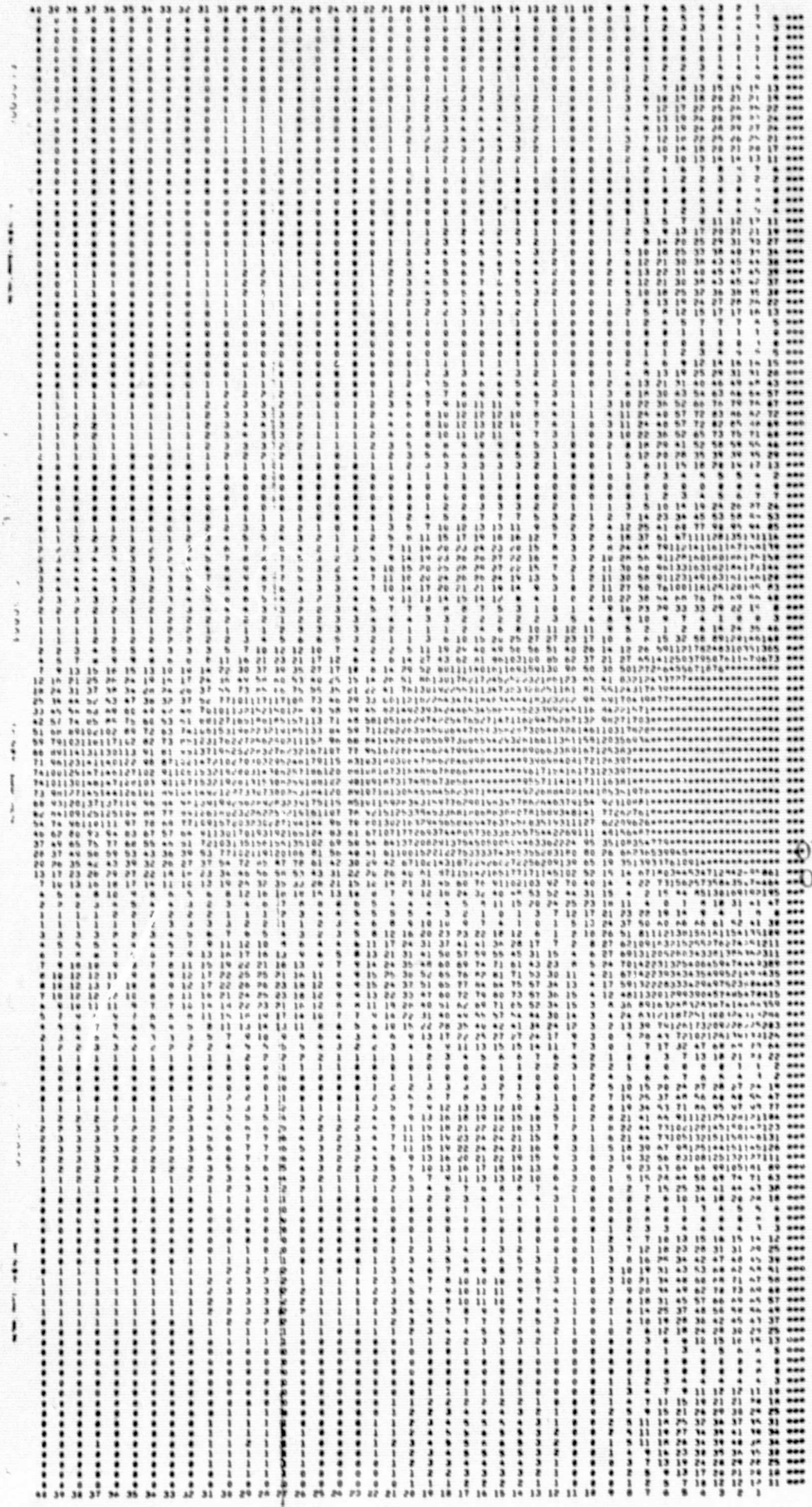
IRRADIANCE ON THE FOCAL PLANE, 10000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.961-MICRONS

VERTICAL SCALE 1-INCH= 10.548-MICRONS

FREE APERTURE



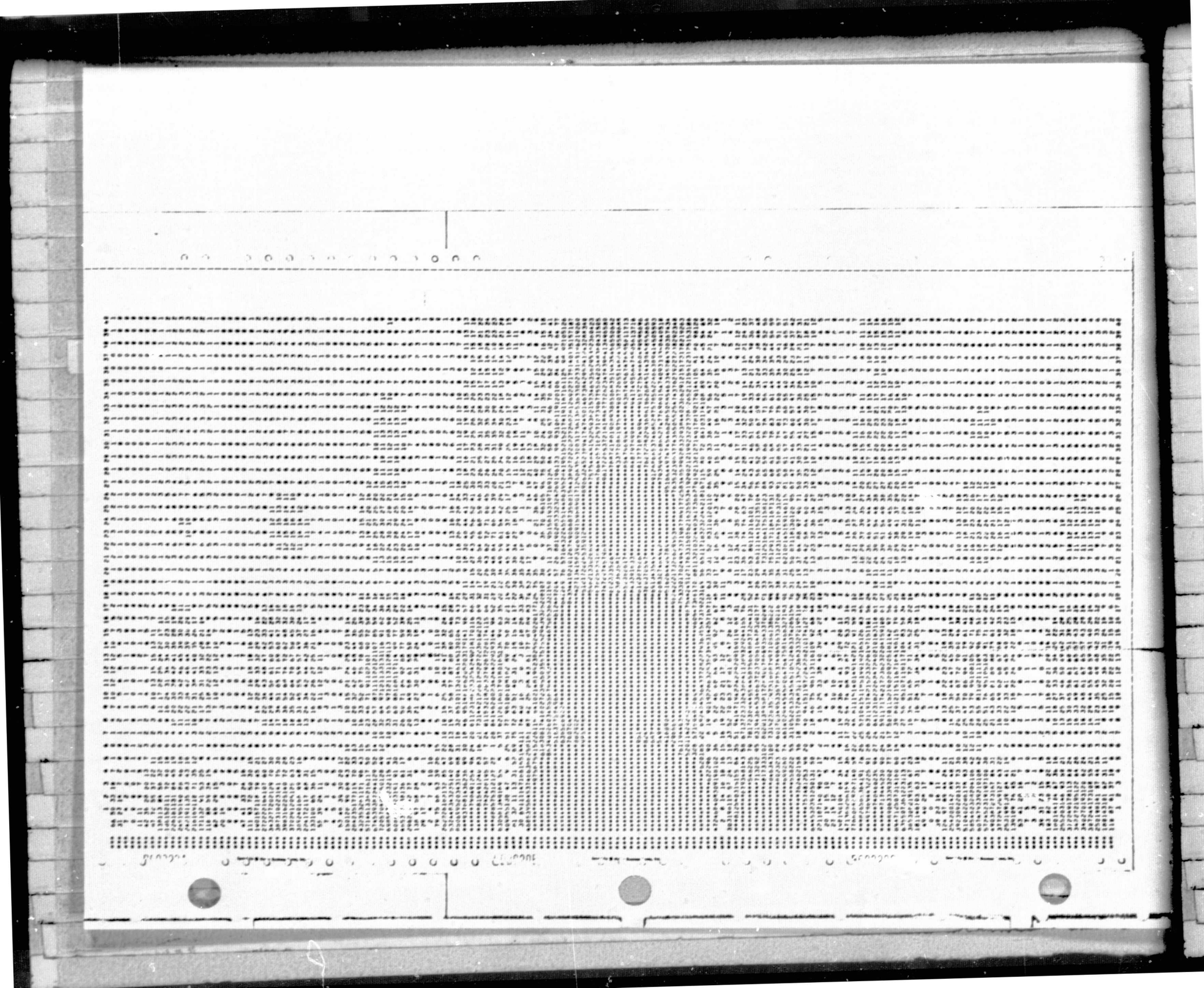


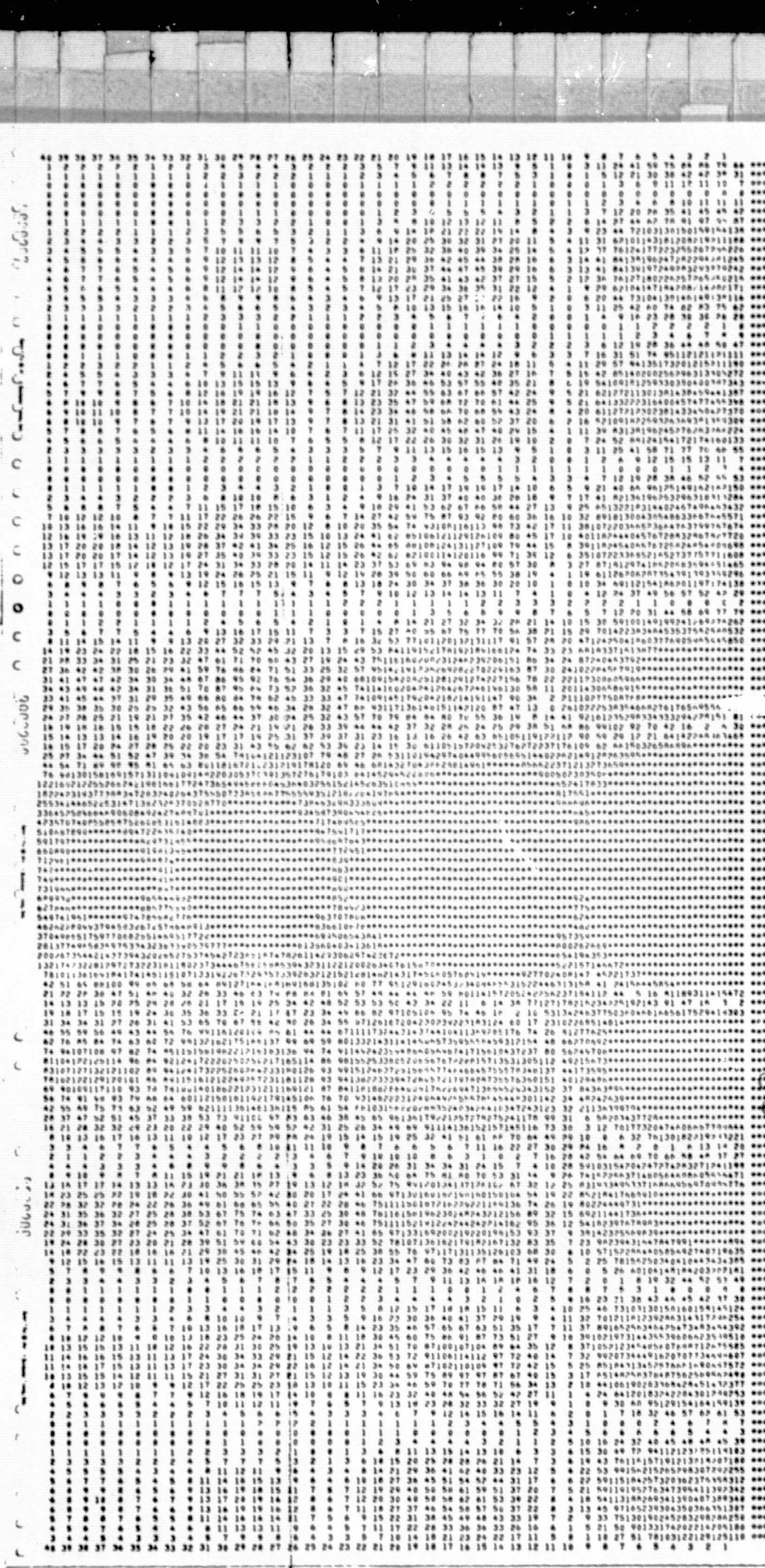
IRRADIANCE ON THE FOCAL PLANE,100000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.961-MICRONS

VERTICAL SCALE 1-INCH= 10.548-MICRONS

FREE APERTURE



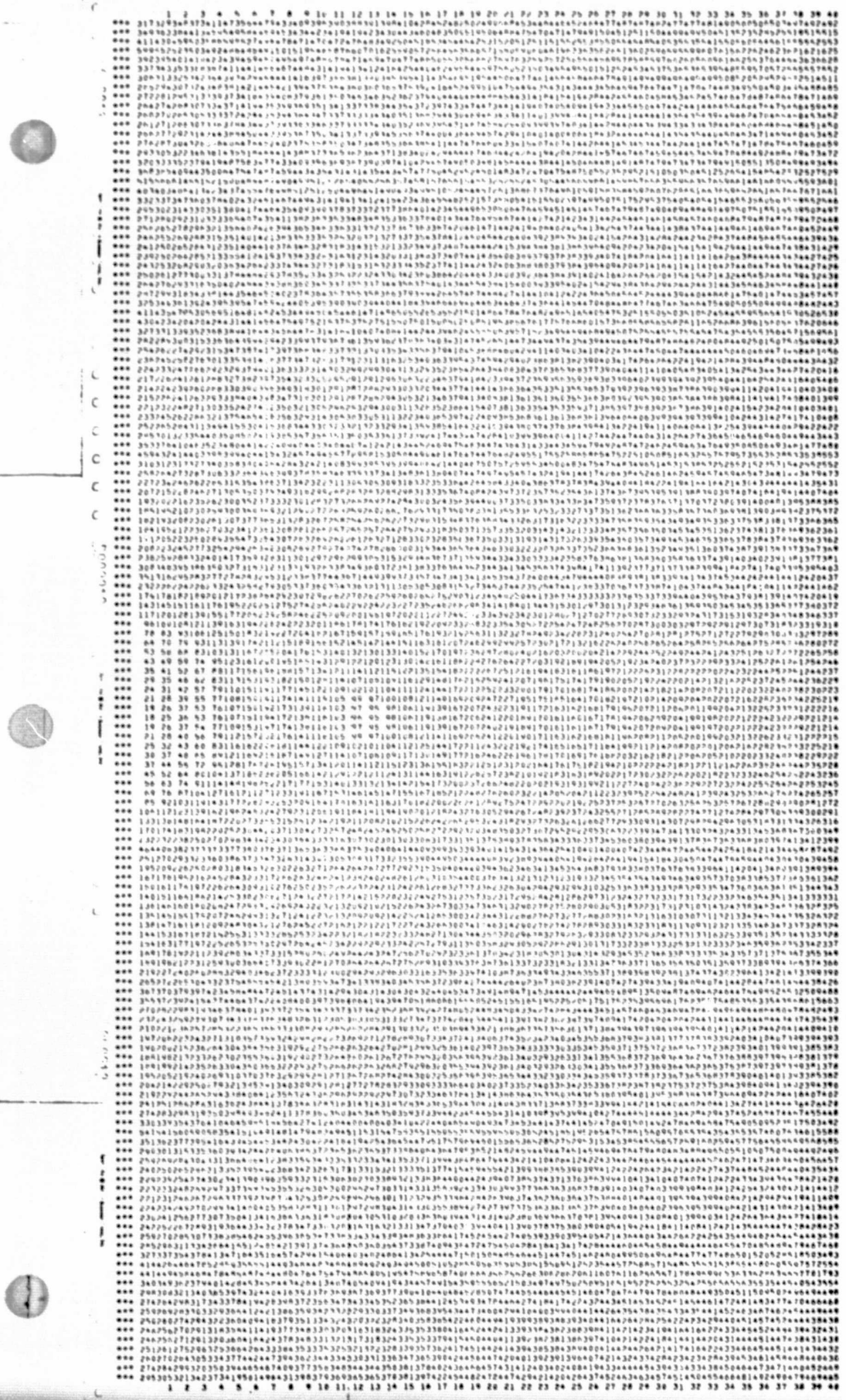


IRRADIANCE ON THE FOCAL PLANE, 0=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.961-MICRONS

VERTICAL SCALE 1-INCH= 10.548-MICRONS

FREE APERTURE



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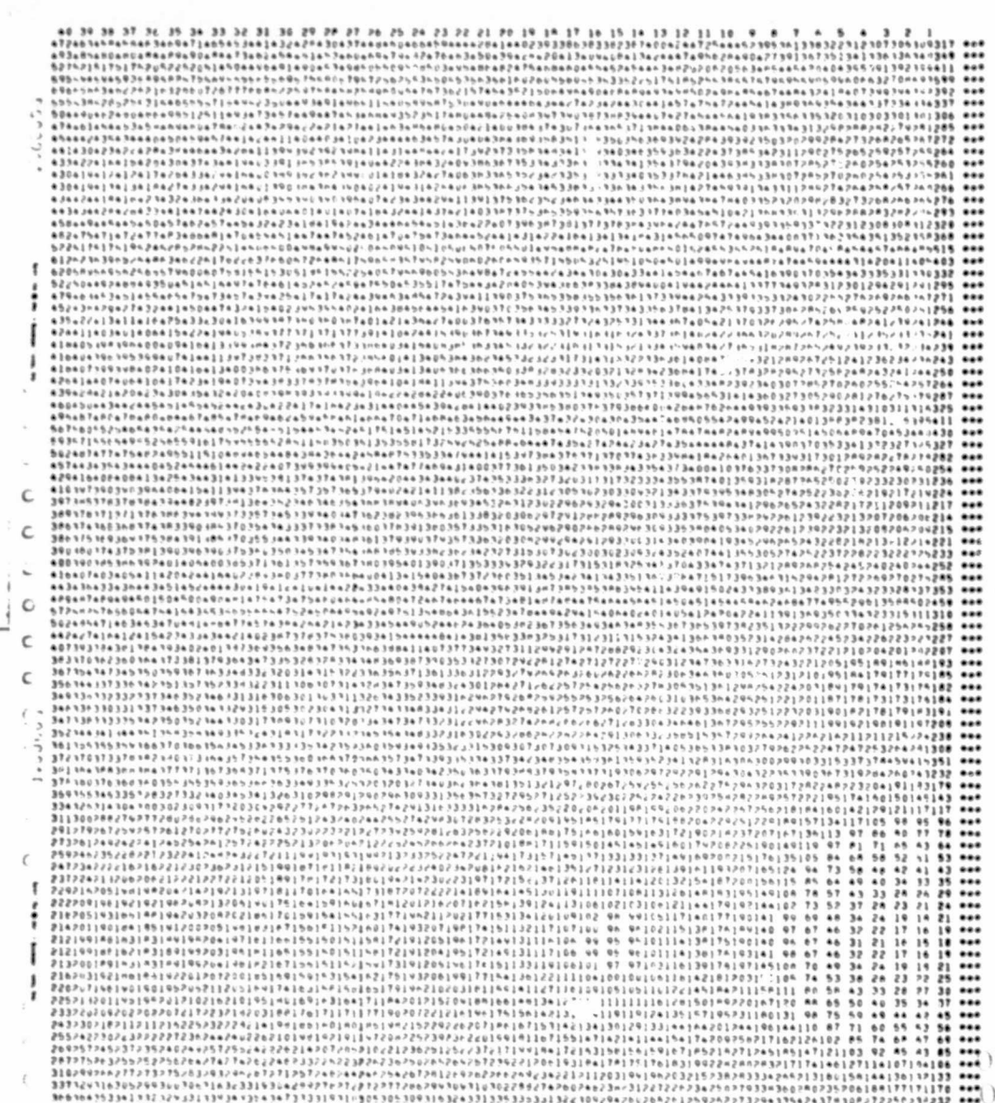


Field point #0, $r_o - r_c = 0$

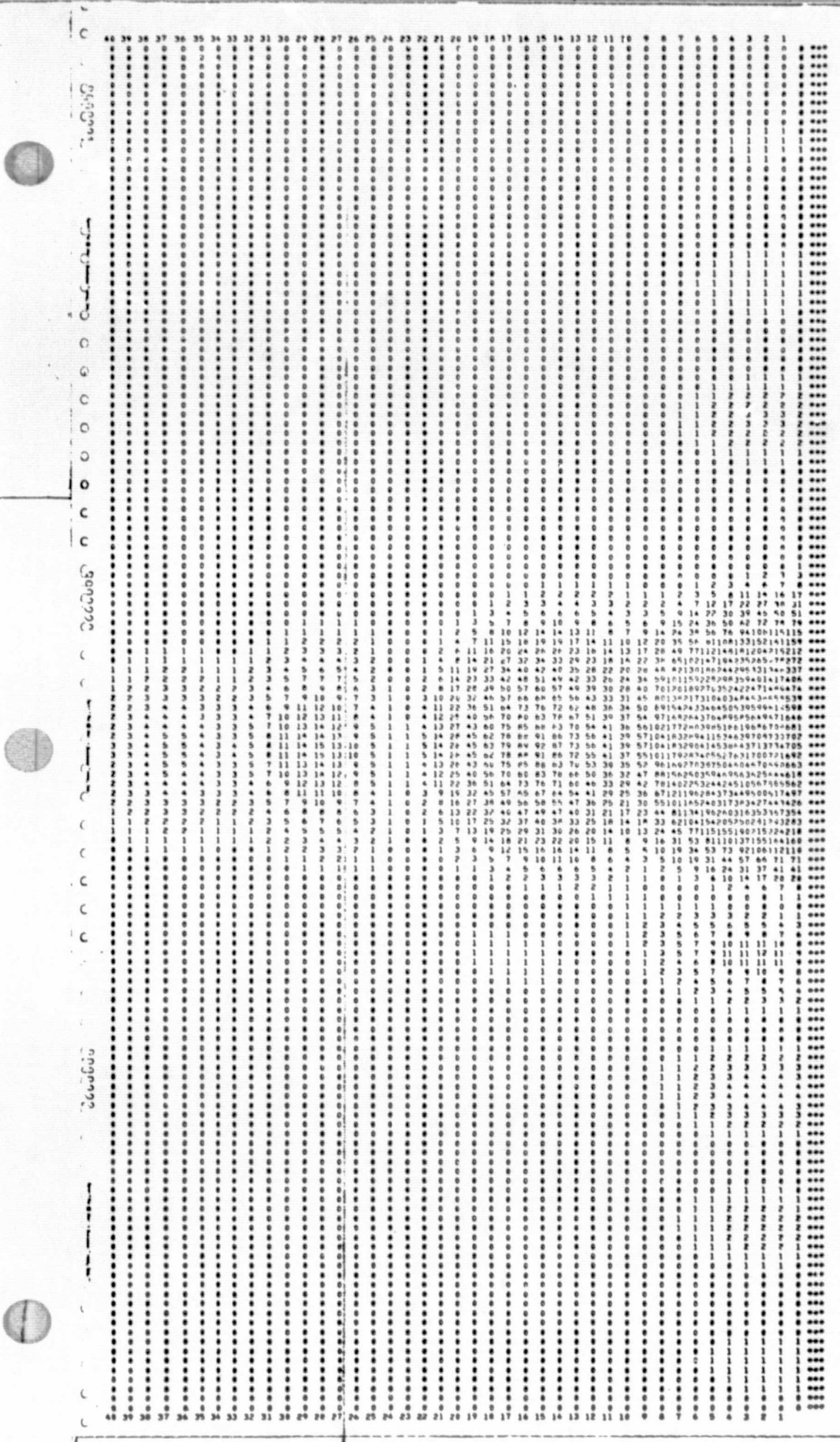
$\cos^2$ weighted aperture

IRRADIANCE ON THE FOCAL PLANE. 1000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.961-MICRONS

VERTICAL SCALE 1-INCH= 10.548-MICRONS

.207FILTER TRANSMITTANCE AT EDGE OF APERTURE

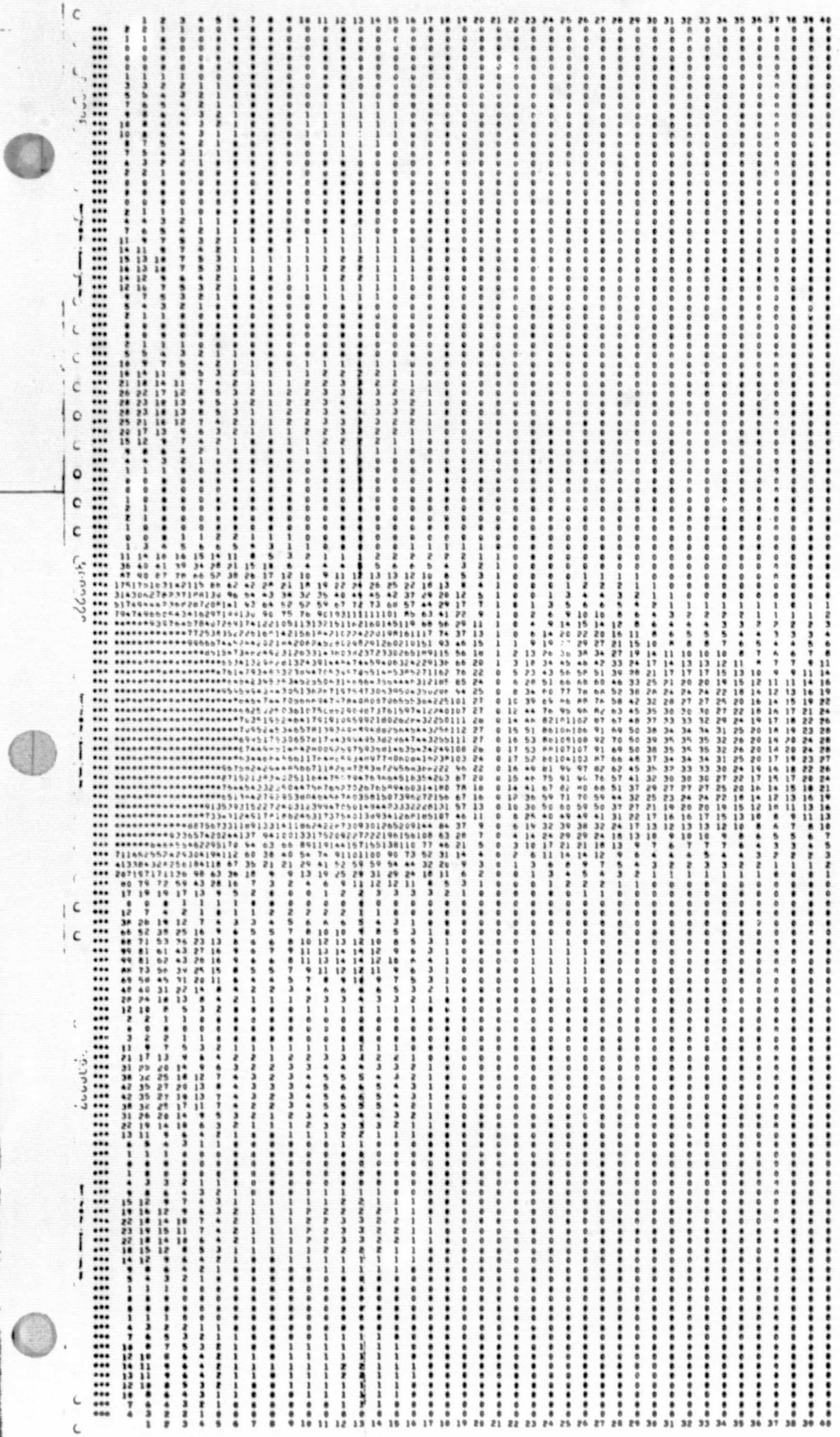


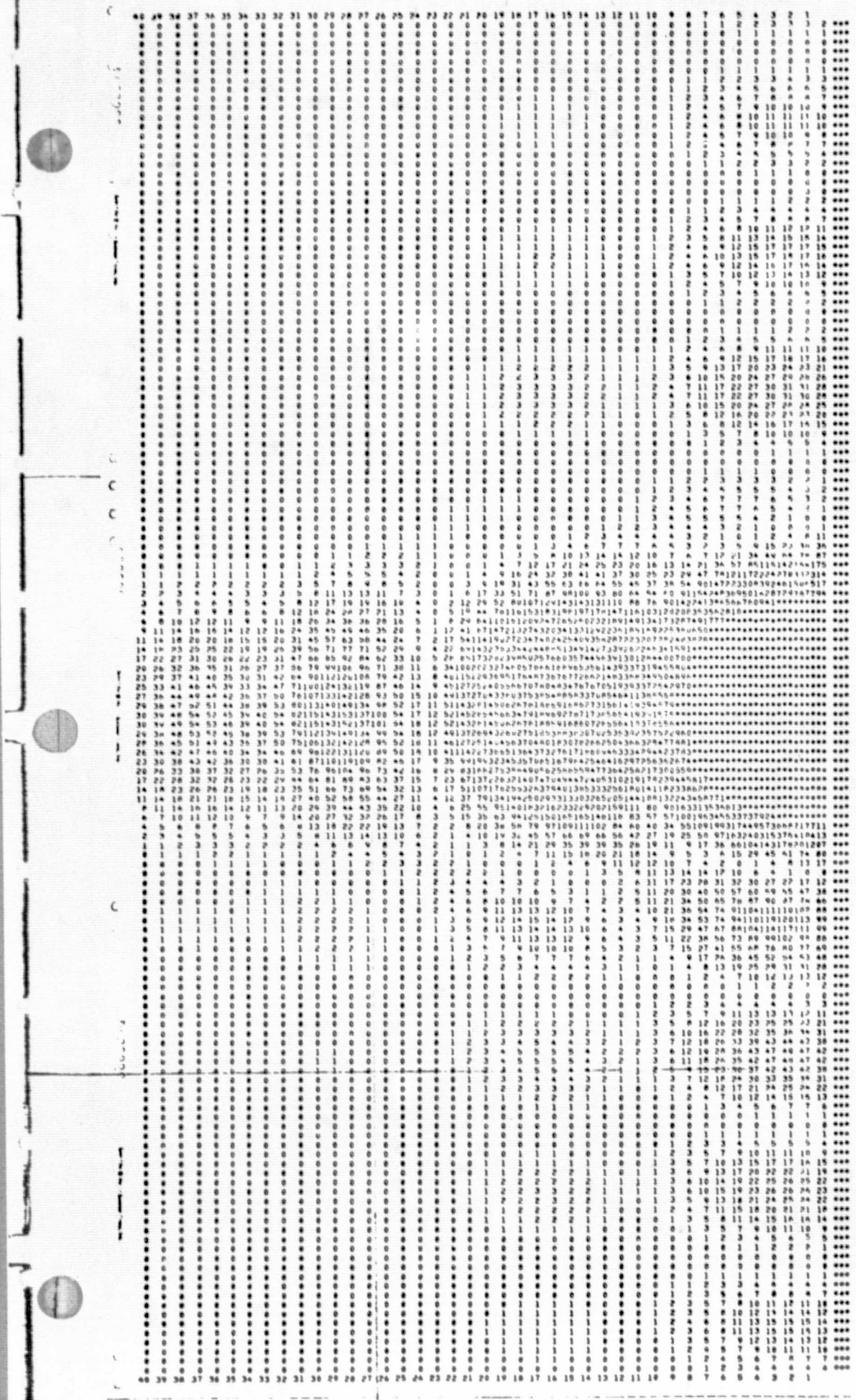
IRRADIANCE ON THE FOCAL PLANE= 10000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.961-MICRONS

VERTICAL SCALE 1-INCH= 10.548-MICRONS

.207FILTER TRANSMITTANCE AT EDGE OF APERTURE





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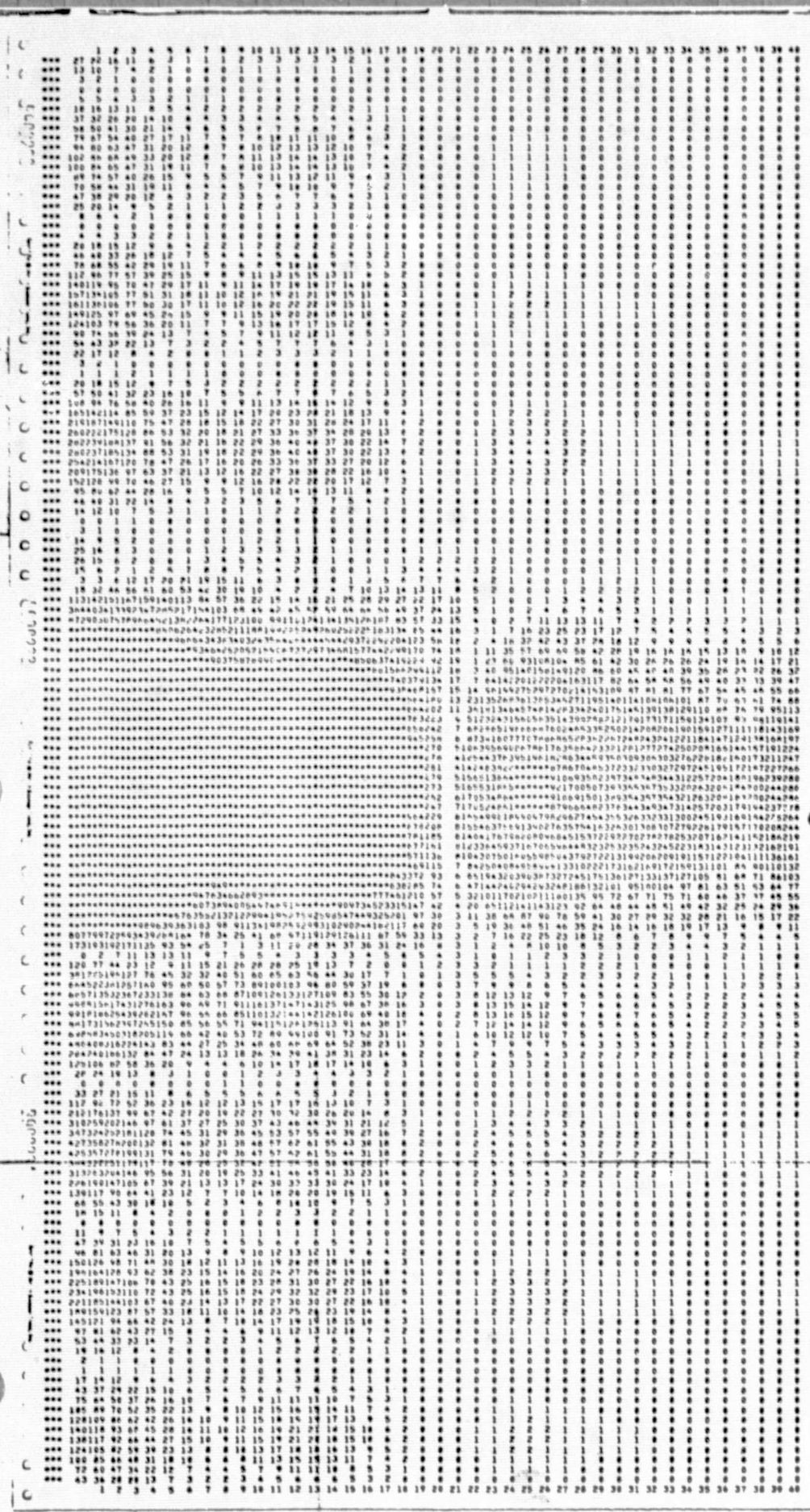
IRRADIANCE ON THE FOCAL PLANE*100000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.961-MICRONS

VERTICAL SCALE 1-INCH= 10.548-MICRONS

*207FILTER TRANSMITTANCE AT EDGE OF APERTURE



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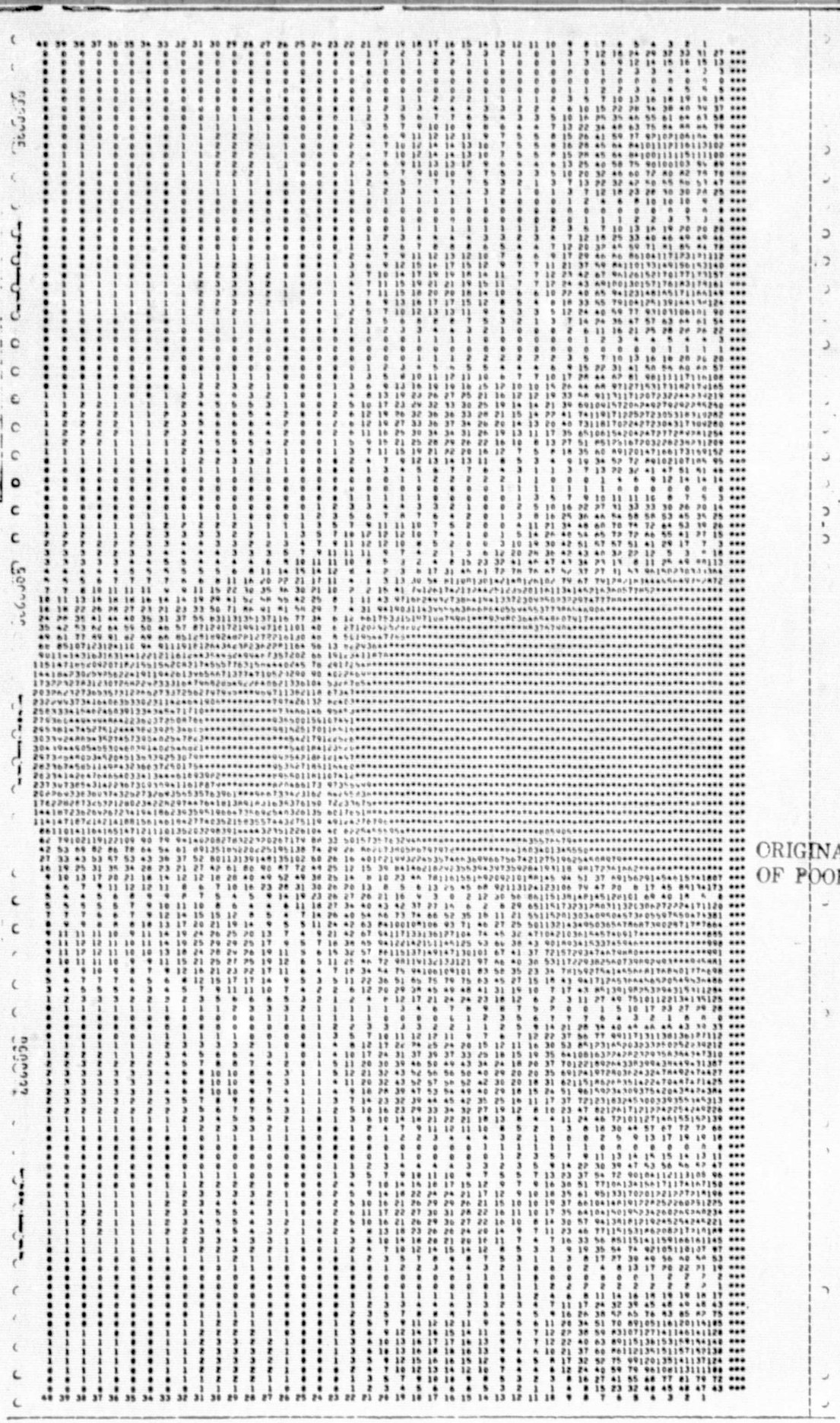


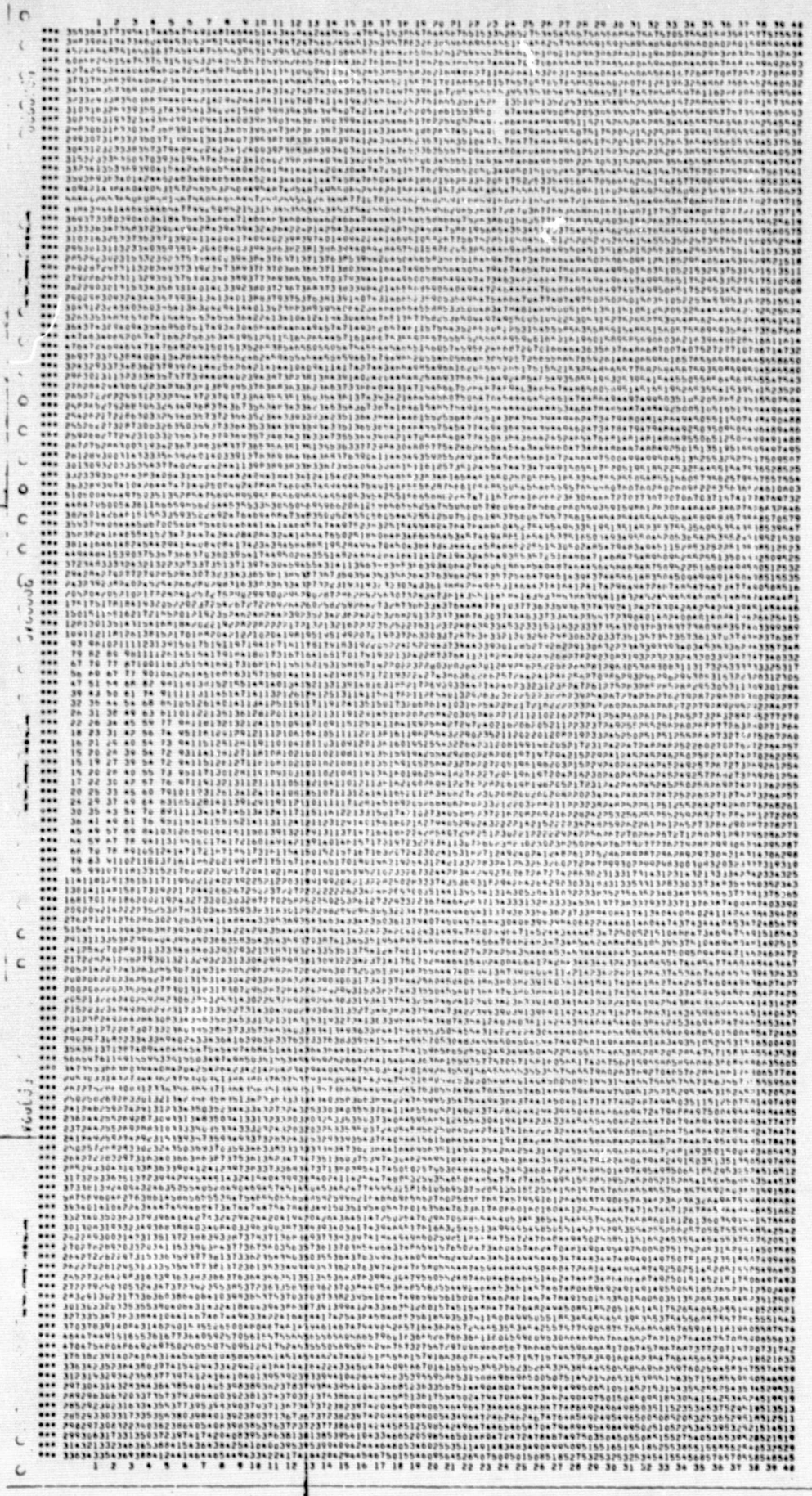
ORIGINAL PAGE IS
OF POOR QUALITY

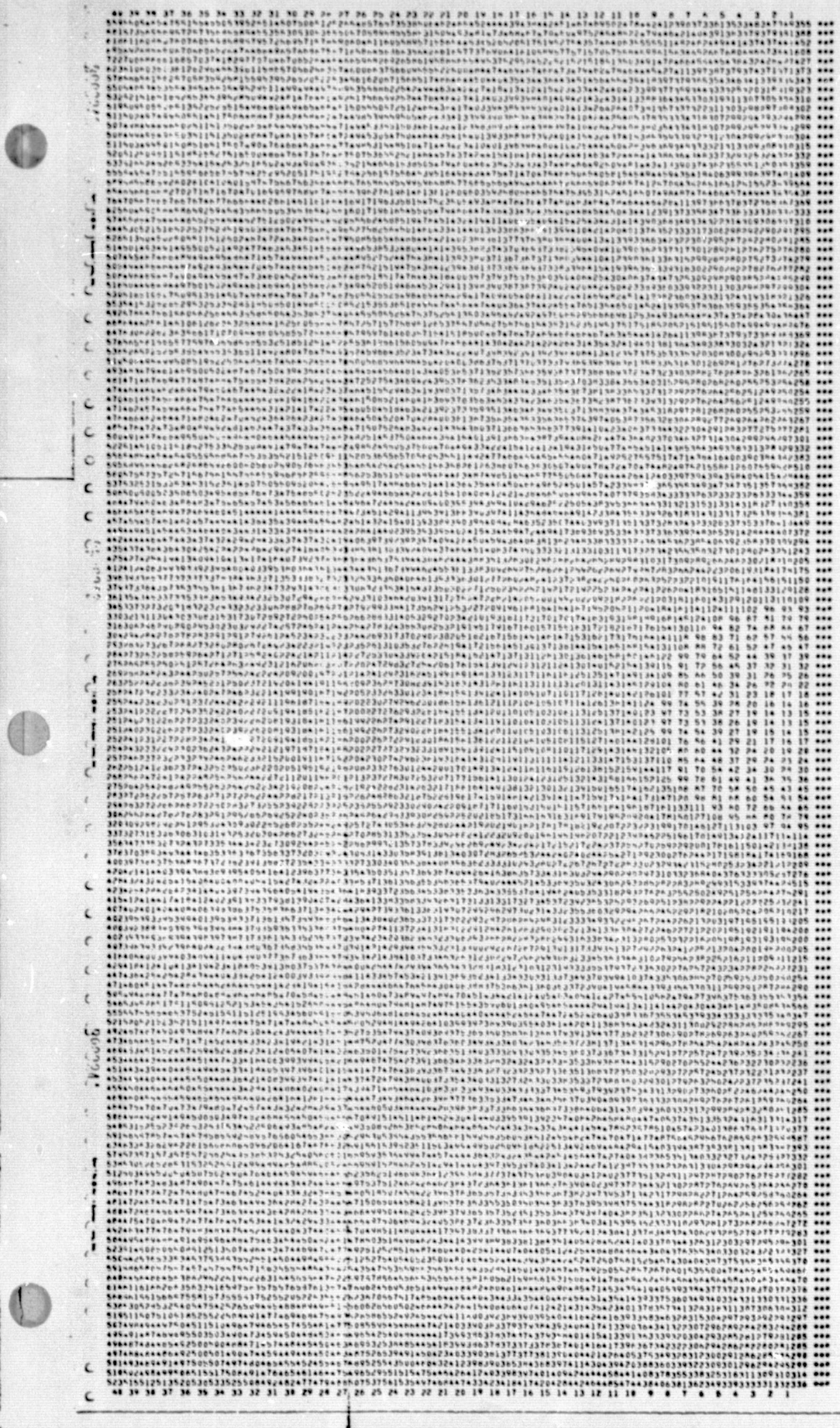
IRRADIANCE ON THE FOCAL PLANE= 0=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.961-MICRONS

VERTICAL SCALE 1-INCH= 10.548-MICRONS

.207FILTER TRANSMITTANCE AT EDGE OF APERTURE





Field point #1, $r_o - r_c = 1.0$

Free aperture

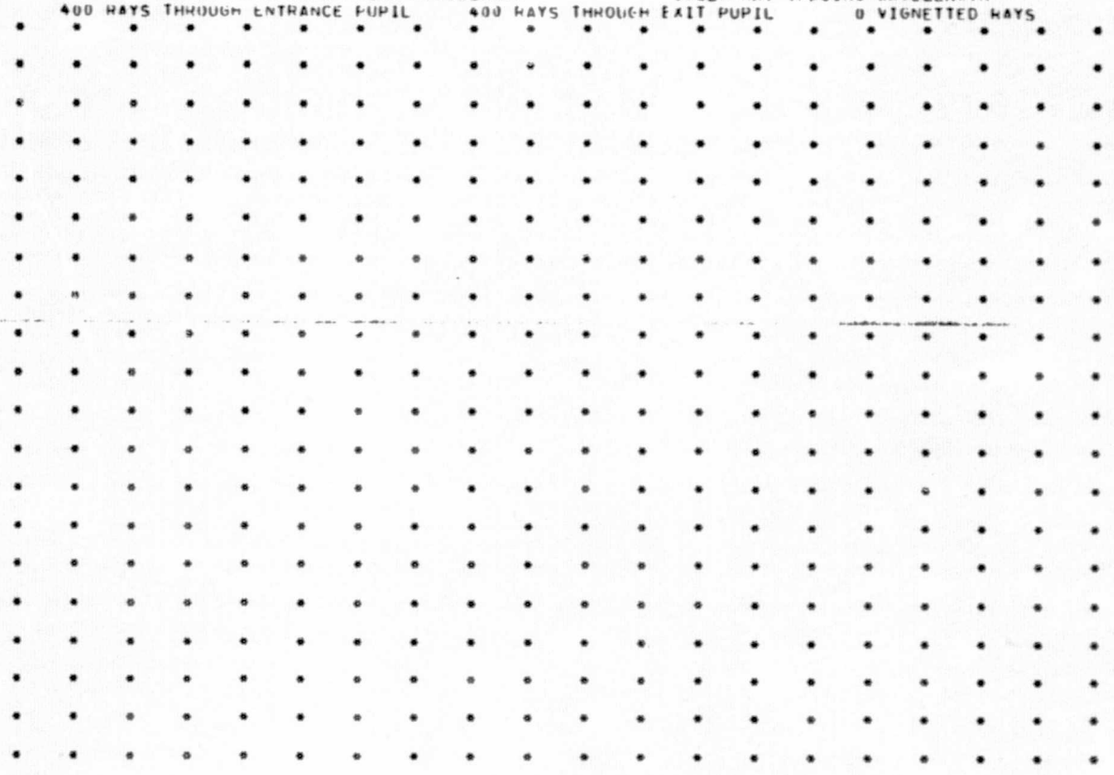
DESIGN NO.A43251X, JPL CORRELATOR, PCC, SHIFT LENS, DUMMY AZIMUTH TELESCOPE. 032377-347

FIELD POINT NO. 1 1.000000=H(Y) 0.000000=H(Z) 0.000000=G(Y) 1.000000=E(Y) 1.014919=E(Z)

-1.040223=HPR(Y) -.010695=HPR(Z) .012502=NA(Y) -.044451=NA(Z)

.6328=REFERENCE FOCUS WAVELENGTH .6328=RAY TRACING WAVELENGTH

400 RAYS THROUGH ENTRANCE PUPIL 400 RAYS THROUGH EXIT PUPIL 0 VIGNETTED RAYS



WAVE ABERRATION (WAVELENGTH UNITS)

.19	-.12	-.32	-.42	-.47	-.47	-.43	-.39	-.36	-.33	-.32	-.34	-.38	-.43	-.49	-.57	-.63	-.70	-.74	-.76
.27	-.05	-.24	-.35	-.39	-.39	-.36	-.32	-.28	-.26	-.25	-.27	-.30	-.36	-.42	-.49	-.56	-.62	-.66	-.67
.35	.03	-.18	-.28	-.33	-.32	-.29	-.26	-.22	-.20	-.19	-.20	-.24	-.29	-.36	-.43	-.50	-.56	-.60	-.61
.40	.08	-.12	-.23	-.27	-.27	-.24	-.20	-.17	-.14	-.14	-.15	-.19	-.24	-.31	-.38	-.45	-.51	-.55	-.56
.46	.14	-.06	-.18	-.22	-.22	-.19	-.16	-.12	-.10	-.10	-.11	-.15	-.20	-.26	-.34	-.41	-.47	-.50	-.51
.51	.18	-.02	-.13	-.18	-.18	-.15	-.12	-.09	-.07	-.06	-.08	-.11	-.17	-.23	-.30	-.37	-.43	-.47	-.48
.55	.22	.01	-.10	-.15	-.15	-.13	-.09	-.06	-.04	-.04	-.05	-.09	-.14	-.21	-.28	-.35	-.41	-.45	-.45
.59	.26	.05	-.07	-.12	-.13	-.10	-.07	-.04	-.02	-.02	-.04	-.07	-.13	-.19	-.27	-.33	-.39	-.42	-.43
.62	.29	.07	-.05	-.10	-.11	-.09	-.06	-.03	-.01	-.01	-.03	-.06	-.12	-.19	-.26	-.32	-.38	-.42	-.42
.65	.31	.09	-.03	-.09	-.10	-.08	-.05	-.02	-.00	-.00	-.02	-.06	-.11	-.18	-.25	-.32	-.38	-.41	-.41
.67	.33	.11	-.02	-.08	-.09	-.07	-.04	-.02	-.00	-.00	-.02	-.06	-.12	-.19	-.26	-.33	-.38	-.42	-.41
.69	.34	.12	-.01	-.07	-.08	-.07	-.05	-.02	-.01	-.01	-.03	-.07	-.13	-.20	-.27	-.34	-.39	-.42	-.42
.71	.36	.13	-.00	-.07	-.08	-.07	-.05	-.03	-.02	-.02	-.04	-.09	-.14	-.21	-.28	-.35	-.41	-.44	-.44
.72	.37	.14	.00	-.07	-.09	-.08	-.06	-.04	-.03	-.03	-.06	-.10	-.16	-.23	-.30	-.37	-.43	-.46	-.46
.74	.38	.15	.00	-.07	-.09	-.09	-.07	-.05	-.05	-.05	-.08	-.12	-.18	-.25	-.33	-.40	-.45	-.48	-.48
.75	.39	.15	.00	-.07	-.10	-.10	-.08	-.07	-.06	-.07	-.10	-.15	-.21	-.28	-.35	-.42	-.48	-.51	-.50
.77	.40	.15	.00	-.08	-.11	-.11	-.10	-.09	-.09	-.10	-.13	-.17	-.23	-.31	-.38	-.45	-.51	-.54	-.54
.79	.41	.16	.00	-.08	-.12	-.12	-.12	-.11	-.11	-.12	-.15	-.20	-.27	-.34	-.41	-.49	-.54	-.57	-.56
.81	.43	.17	.00	-.09	-.13	-.14	-.13	-.13	-.13	-.15	-.18	-.23	-.30	-.37	-.45	-.52	-.58	-.61	-.60
.82	.44	.17	.01	-.09	-.13	-.15	-.15	-.15	-.15	-.17	-.21	-.26	-.33	-.40	-.49	-.56	-.62	-.65	-.64

SQUARED-COS WEIGHTED APERTURE

FILTER WEIGHTS (AMPLITUDE RATIO)

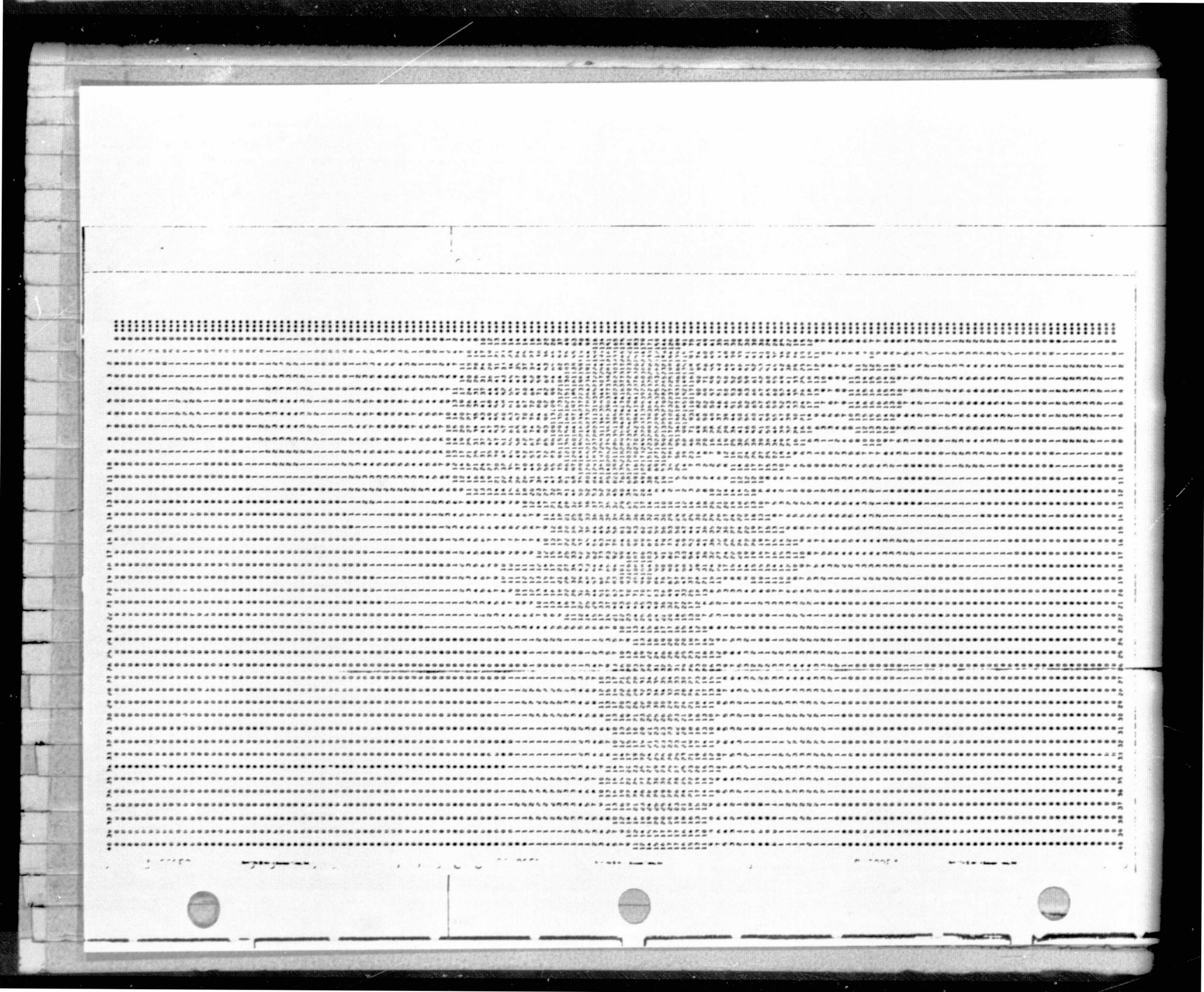
.21	.23	.25	.28	.31	.35	.39	.42	.44	.46	.46	.44	.42	.39	.35	.31	.28	.25	.22	.21
.22	.23	.26	.29	.33	.37	.41	.45	.47	.48	.48	.47	.45	.41	.37	.33	.29	.26	.23	.22
.25	.26	.29	.32	.37	.41	.46	.49	.52	.53	.53	.52	.49	.46	.41	.37	.32	.29	.26	.25
.28	.29	.32	.36	.41	.46	.51	.56	.59	.60	.60	.59	.56	.51	.46	.41	.36	.32	.29	.28
.31	.33	.37	.41	.47	.53	.58	.63	.66	.68	.68	.66	.63	.58	.53	.47	.41	.37	.33	.31
.35	.37	.41	.46	.53	.59	.65	.71	.75	.77	.77	.75	.71	.66	.59	.53	.46	.41	.37	.35
.39	.41	.46	.51	.58	.66	.72	.78	.83	.85	.85	.83	.78	.72	.66	.58	.51	.46	.41	.39
.42	.45	.49	.56	.63	.71	.78	.85	.89	.92	.92	.89	.85	.78	.71	.63	.56	.49	.45	.42
.44	.47	.52	.59	.66	.75	.83	.89	.94	.97	.97	.94	.89	.83	.75	.66	.59	.52	.47	.44
.46	.48	.53	.60	.68	.77	.85	.92	.97	.99	.99	.97	.92	.85	.77	.68	.60	.53	.48	.46
.46	.48	.53	.60	.68	.77	.85	.92	.97	.99	.99	.97	.92	.85	.77	.68	.60	.53	.48	.46
.44	.47	.52	.59	.66	.75	.83	.89	.94	.97	.97	.94	.89	.83	.75	.66	.59	.52	.47	.44
.42	.45	.49	.56	.63	.71	.78	.85	.89	.92	.92	.89	.85	.78	.71	.63	.56	.49	.45	.42
.39	.41	.46	.51	.58	.66	.72	.78	.83	.85	.85	.83	.78	.72	.66	.58	.51	.46	.41	.39
.35	.37	.41	.46	.53	.59	.66	.71	.75	.77	.77	.75	.71	.66	.59	.53	.46	.41	.37	.35
.31	.33	.37	.41	.47	.53	.58	.63	.66	.68	.68	.66	.63	.58	.53	.47	.41	.37	.33	.31
.28	.29	.32	.36	.41	.46	.51	.56	.59	.60	.60	.59	.56	.51	.46	.41	.36	.32	.29	.28
.25	.26	.29	.32	.37	.41	.46	.49	.52	.53	.53	.52	.49	.46	.41	.37	.32	.29	.26	.25
.22	.23	.26	.29	.33	.37	.41	.45	.47	.48	.48	.47	.45	.41	.37	.33	.29	.26	.23	.22
.21	.22	.25	.28	.31	.35	.39	.42	.44	.46	.46	.44	.42	.39	.35	.31	.28	.25	.22	.21

IRRADIANCE ON THE FOCAL PLANE, 1000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.965-MICRONS

VERTICAL SCALE 1-INCH= 10.543-MICRONS

FREE APERTURE

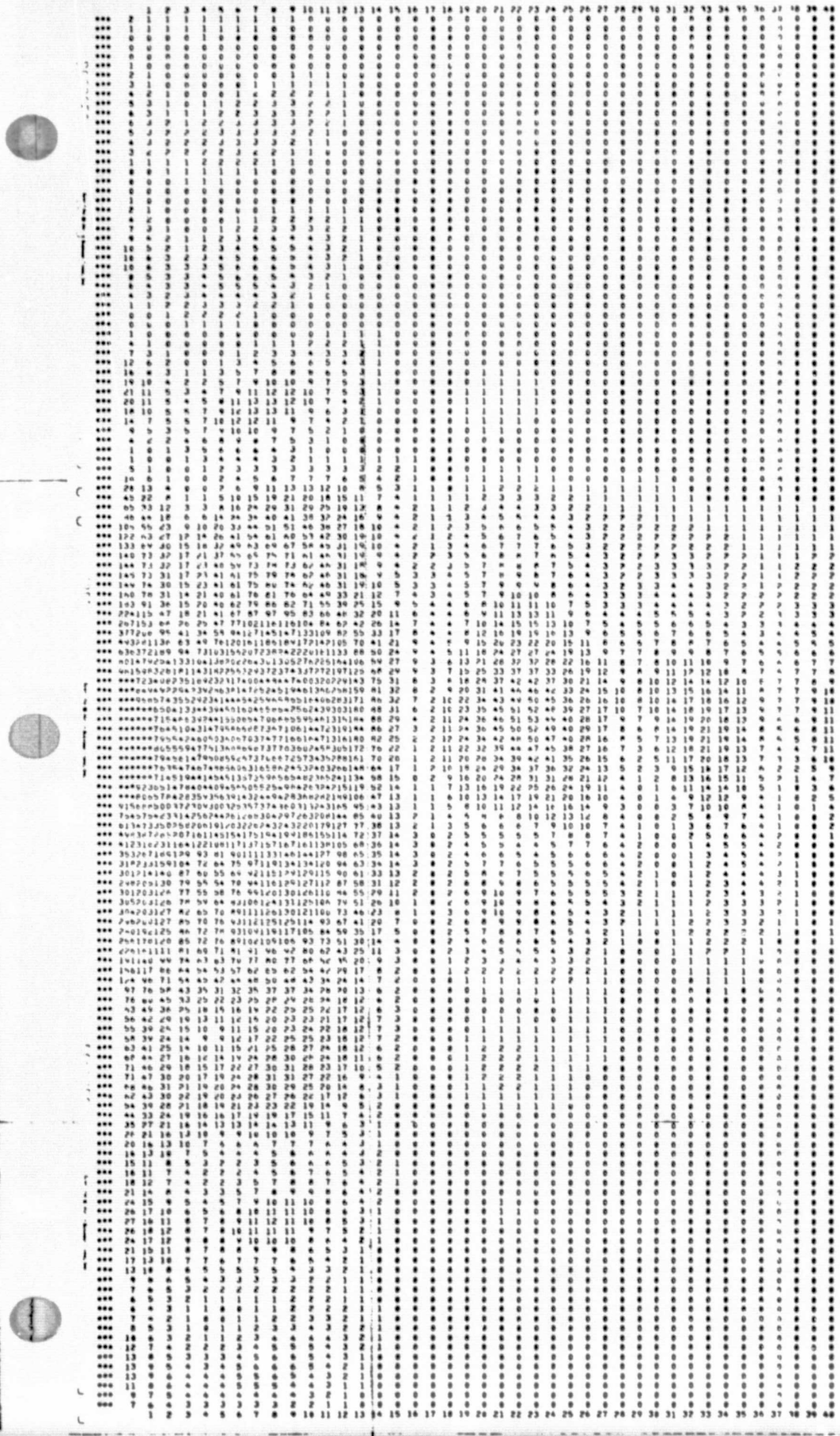


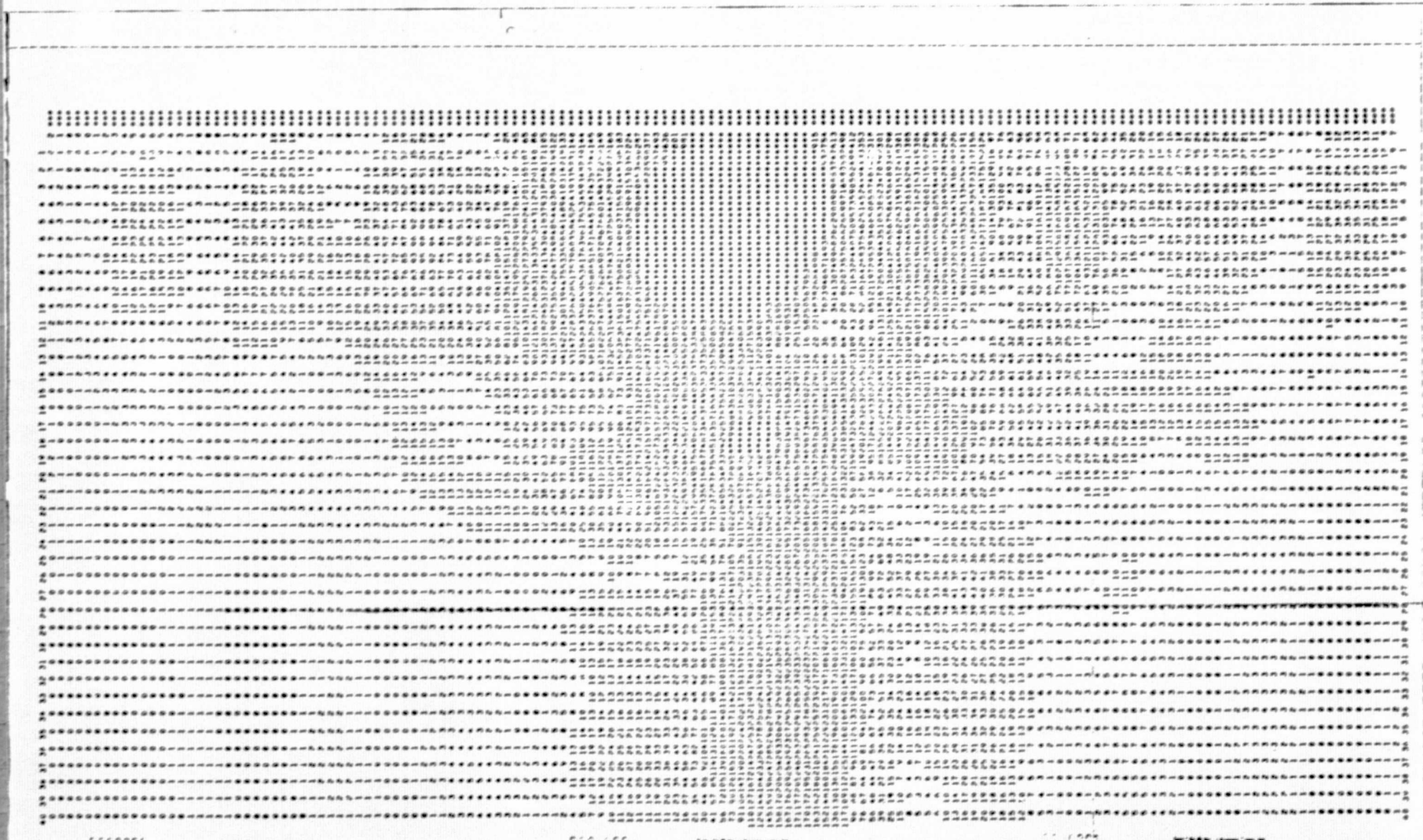
IRRADIANCE ON THE FOCAL PLANE, 10000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.965-MICRONS

VERTICAL SCALE 1-INCH= 10.543-MICRONS

FREE APERTURE



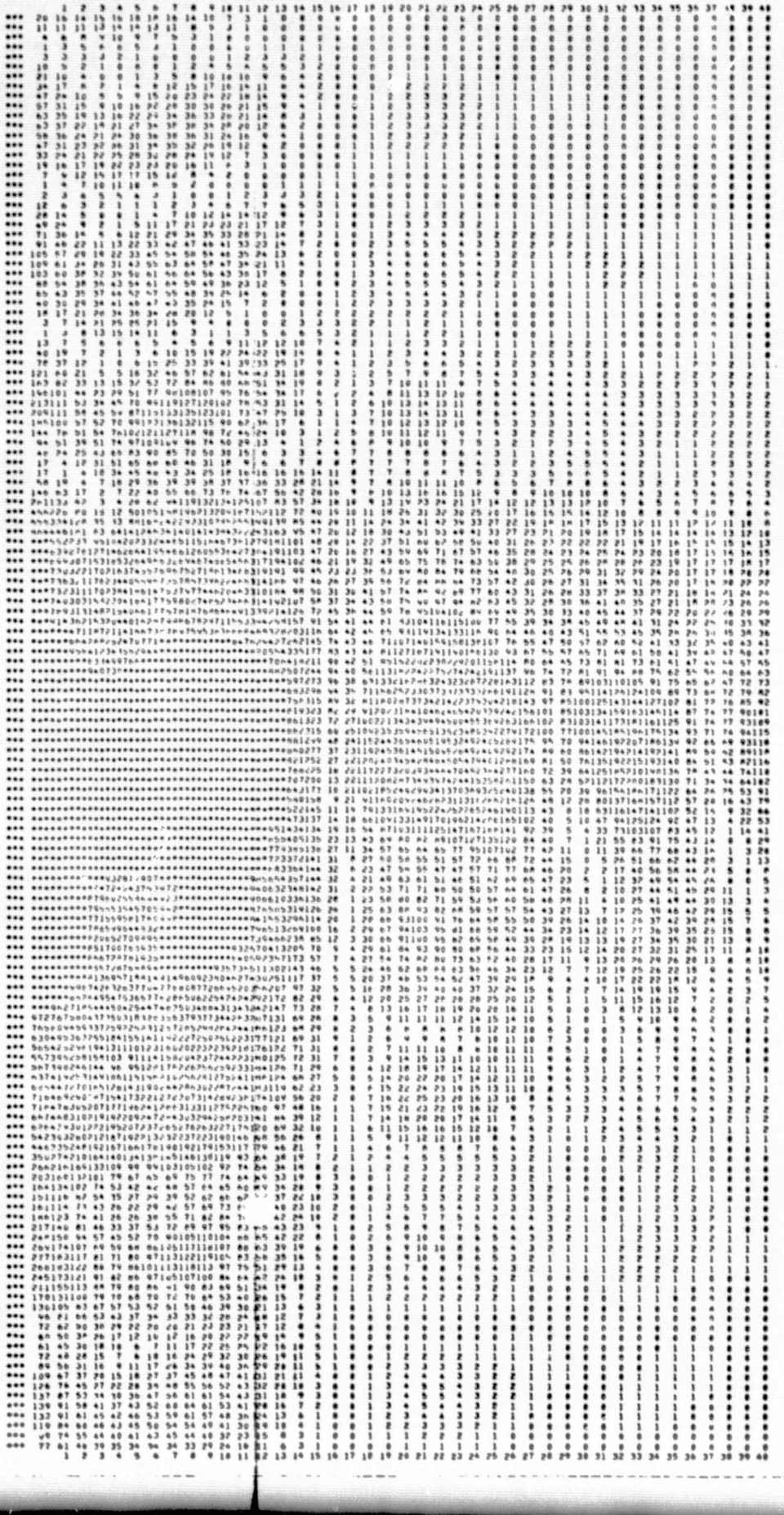


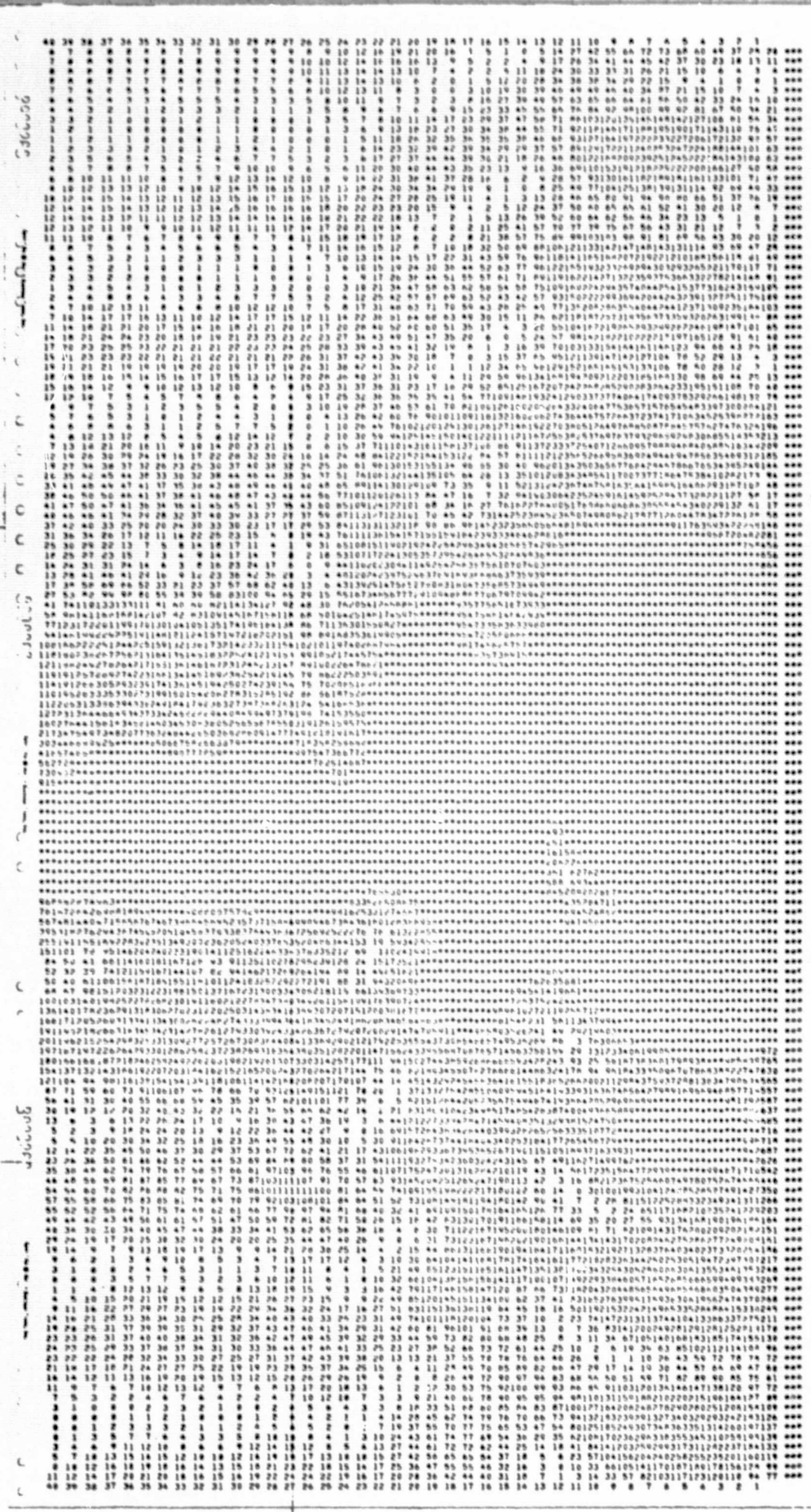
IRRADIANCE ON THE FOCAL PLANE, 100000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.965-MICRONS

VERTICAL SCALE 1-INCH= 10.543-MICRONS

FREE APERTURE





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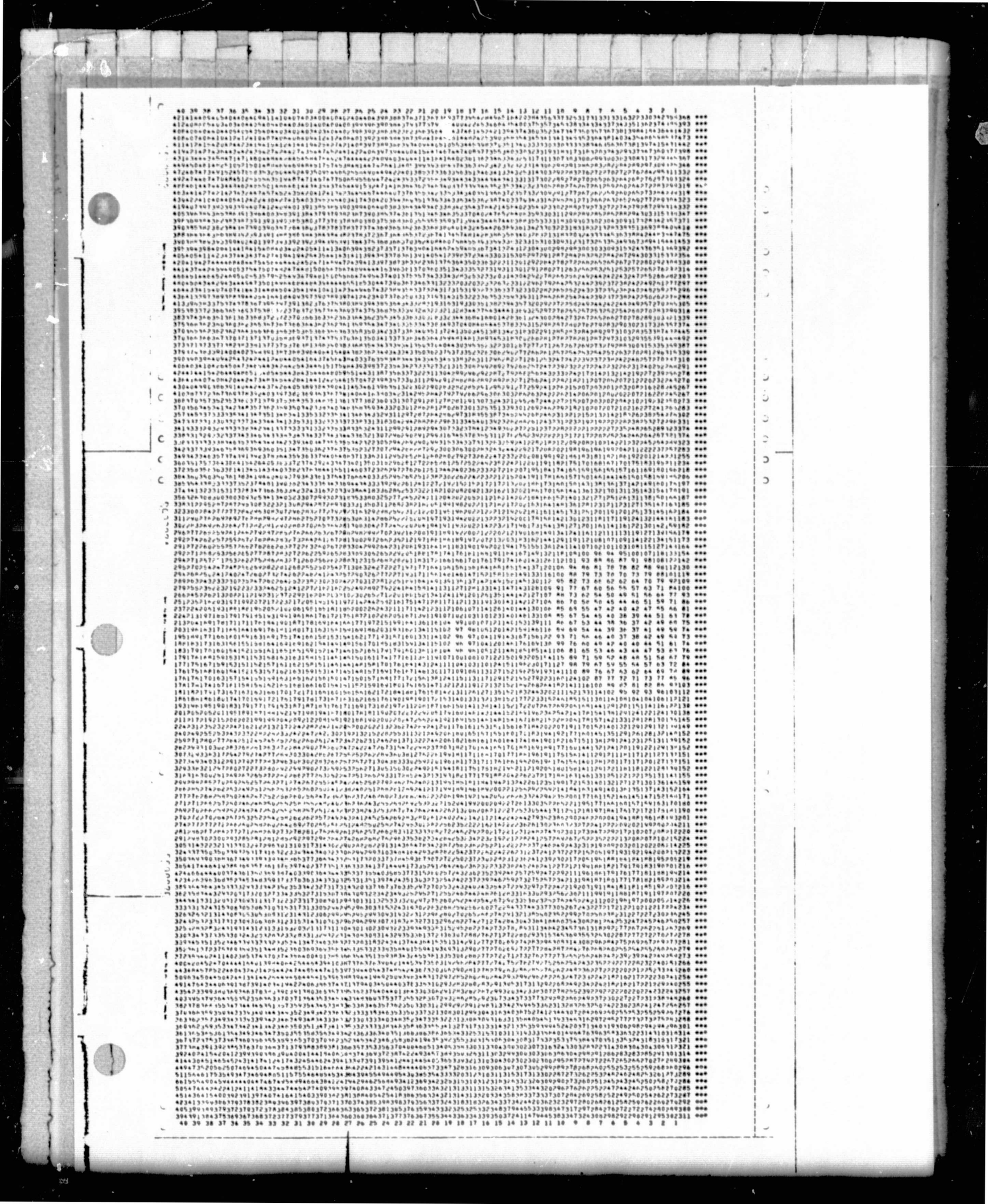
IRRADIANCE ON THE FOCAL PLANE, 0=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.965-MICRONS

VERTICAL SCALE 1-INCH= 10.543-MICRONS

FREE APERTURE



Field point #1, $r_o - r_c = 1.0$

$\cos^2$ weighted aperture

IRRADIANCE ON THE FOCAL PLANE, 1000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.965-MICRONS

VERTICAL SCALE 1-INCH= 10.543-MICRONS

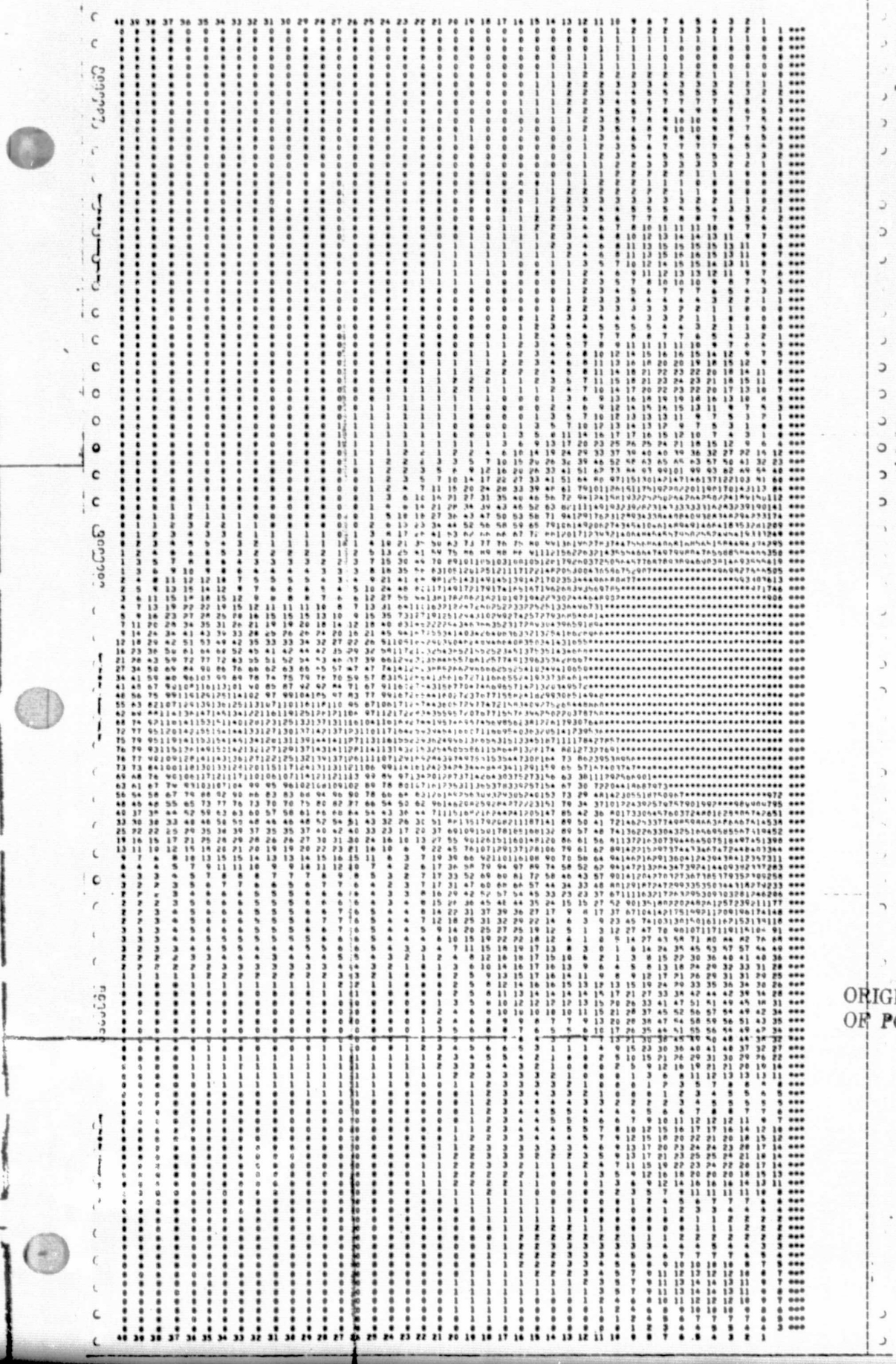
.207FILTER TRANSMITTANCE AT EDGE OF APERTURE

IRRADIANCE ON THE FOCAL PLANE, 10000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.965-MICRONS

VERTICAL SCALE 1-INCH= 10.543-MICRONS

.207FILTER TRANSMITTANCE AT EDGE OF APERTURE



ORIGINAL PAGE IS
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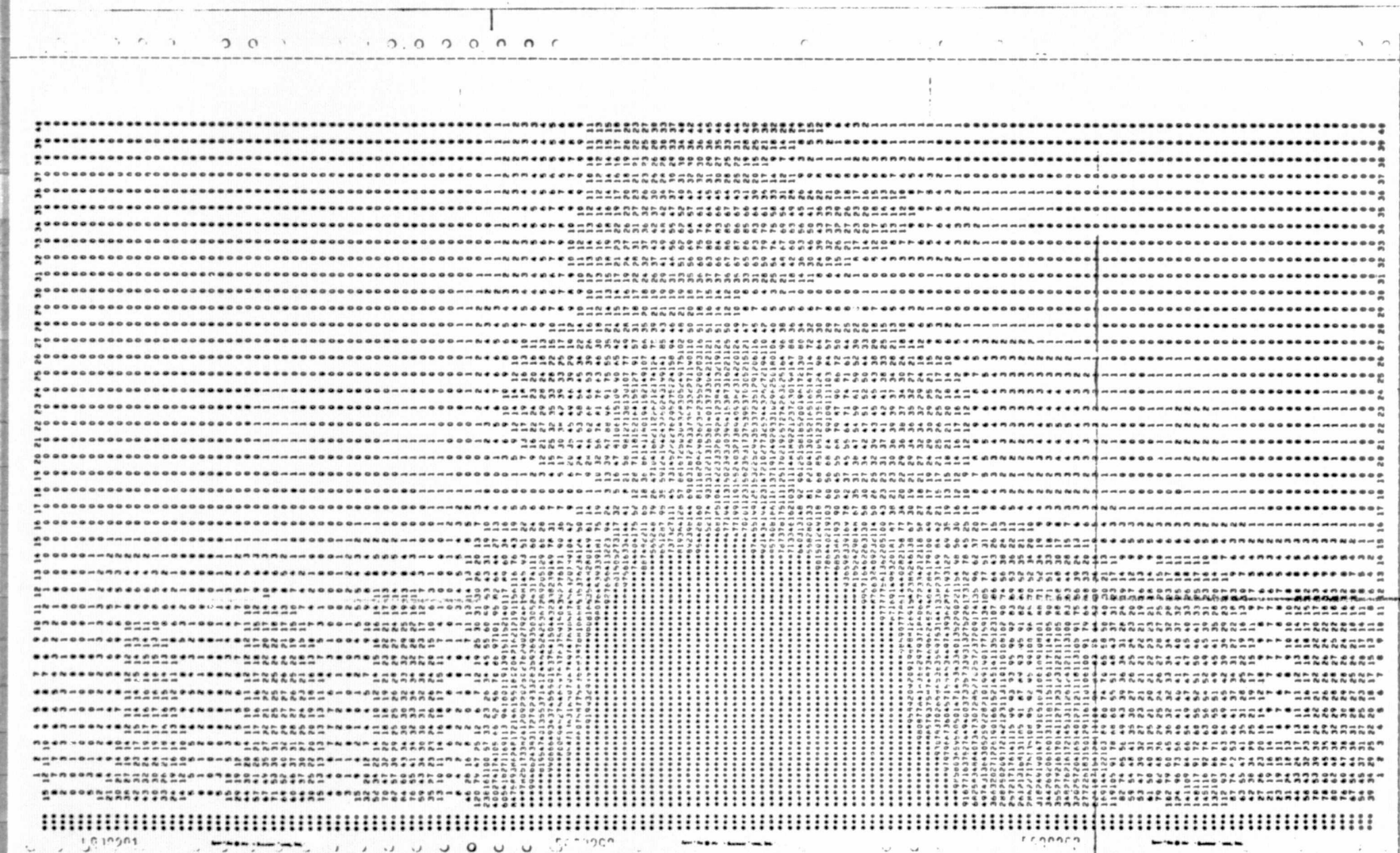
IRRADIANCE ON THE FOCAL PLANE,100000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.965-MICRONS

VERTICAL SCALE 1-INCH= 10.543-MICRONS

.207FILTER TRANSMITTANCE AT EDGE OF APERTURE



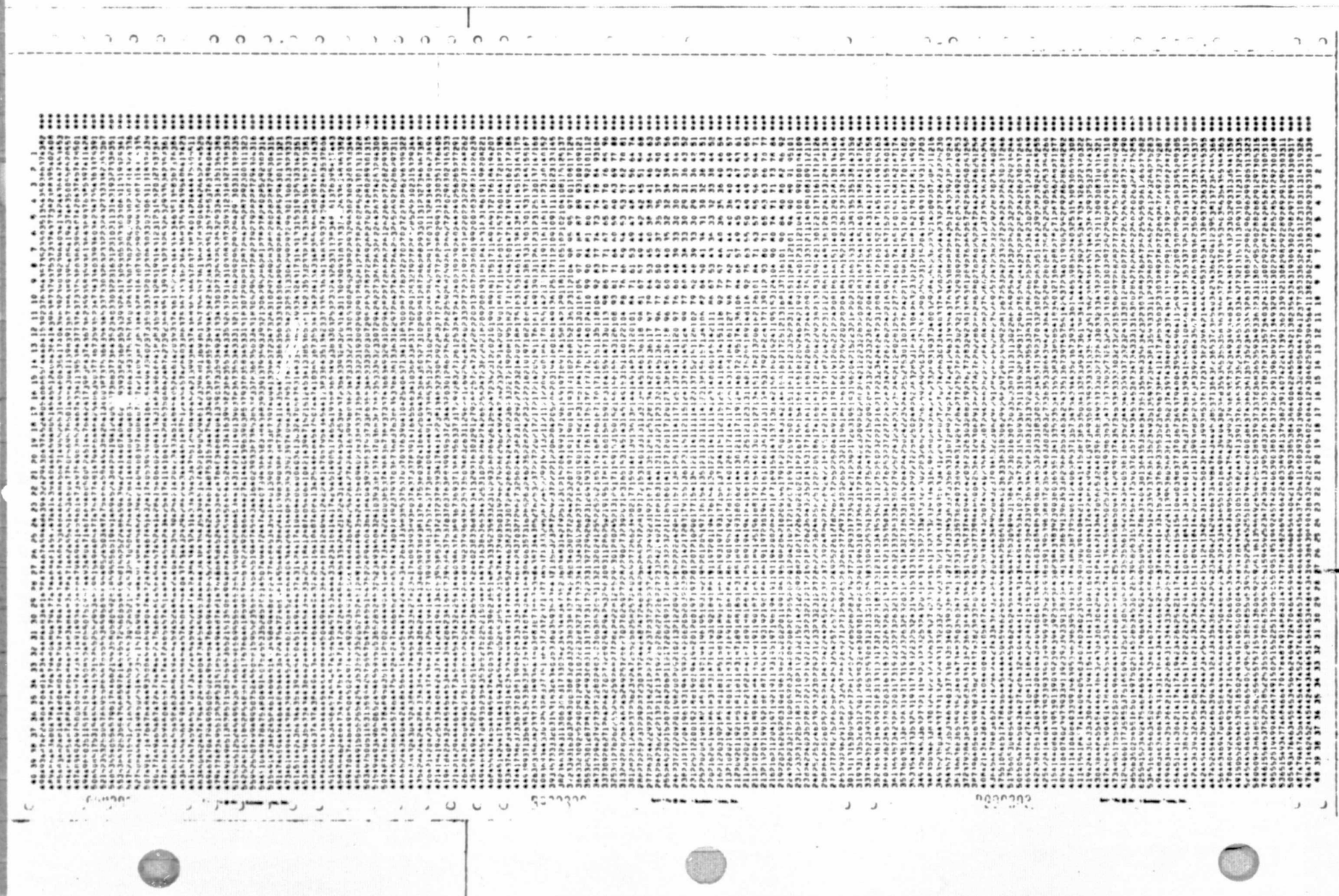
IRRADIANCE ON THE FOCAL PLANE. 0=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.965-MICRONS

VERTICAL SCALE 1-INCH= 10.543-MICRONS

.207FILTER TRANSMITTANCE AT EDGE OF APERTURE

ORIGINAL PAGE IS
OF POOR QUALITY



Field point #2, r -r =-1.0

Free aperture

DESIGN NO.64325IX, JPL CORRELATOR, RCC, SHIFT LENS, DUMMY AZIMUTH TELESCOPE. 032377-347

FIELD POINT NO. 2 -1.000000=H(Y) 0.000000=H(Z) 0.000000=G(Y) 1.000000=E(Y) .985081=E(Z)

.892189=HPR(Y) .010595=HPR(Z) .012492=NA(Y) -.044727=NA(Z)

.6328=REFERENCE FOCUS WAVELENGTH .6328=RAY TRACING WAVELENGTH

400 RAYS THROUGH ENTRANCE PUPIL 400 RAYS THROUGH EXIT PUPIL 0 VIGNETTED RAYS

WAVE ABERRATION (WAVELENGTH UNITS)

.12 -.05 -.14 -.19 -.19 -.18 -.16 -.13 -.13 -.13 -.15 -.18 -.22 -.27 -.30 -.31 -.27 -.16 .04 .37

.13 -.04 -.13 -.17 -.18 -.16 -.13 -.11 -.10 -.10 -.11 -.15 -.18 -.23 -.26 -.26 -.22 -.11 .09 .42

.12 -.04 -.13 -.17 -.16 -.15 -.11 -.09 -.07 -.07 -.08 -.11 -.15 -.19 -.22 -.23 -.18 -.07 .13 .46

.12 -.04 -.13 -.16 -.16 -.13 -.10 -.07 -.05 -.05 -.06 -.09 -.12 -.16 -.19 -.19 -.15 -.04 .17 .50

.11 -.05 -.13 -.16 -.15 -.13 -.09 -.06 -.04 -.03 -.04 -.07 -.10 -.14 -.16 -.16 -.12 -.01 .19 .53

.10 -.05 -.13 -.16 -.15 -.12 -.09 -.05 -.03 -.02 -.03 -.05 -.08 -.12 -.14 -.14 -.10 .02 .22 .56

.09 -.06 -.14 -.16 -.15 -.12 -.08 -.05 -.02 -.01 -.02 -.04 -.07 -.10 -.12 -.12 -.07 .04 .25 .58

.08 -.07 -.15 -.17 -.16 -.12 -.08 -.05 -.02 -.01 -.01 -.03 -.06 -.09 -.11 -.11 -.06 .05 .26 .60

.06 -.08 -.16 -.18 -.16 -.13 -.09 -.05 -.02 -.00 -.01 -.02 -.05 -.08 -.10 -.09 -.05 .07 .28 .61

.05 -.10 -.17 -.19 -.17 -.13 -.09 -.05 -.02 -.00 -.00 -.02 -.04 -.07 -.09 -.08 -.03 .08 .29 .62

.04 -.10 -.17 -.19 -.17 -.14 -.09 -.05 -.02 -.00 -.00 -.02 -.04 -.07 -.08 -.07 -.03 .09 .30 .63

.03 -.11 -.18 -.20 -.18 -.14 -.10 -.06 -.02 -.00 -.00 -.01 -.04 -.06 -.08 -.07 -.02 .10 .31 .64

.02 -.12 -.19 -.20 -.19 -.15 -.10 -.06 -.02 -.00 -.00 -.01 -.04 -.06 -.07 -.07 -.01 .11 .31 .65

.01 -.13 -.19 -.21 -.19 -.15 -.10 -.06 -.03 -.01 -.00 -.01 -.03 -.06 -.07 -.06 -.01 .11 .32 .65

.01 -.13 -.19 -.21 -.19 -.15 -.11 -.06 -.03 -.01 -.00 -.01 -.03 -.05 -.07 -.05 -.00 .12 .33 .66

.01 -.12 -.19 -.21 -.19 -.15 -.11 -.06 -.03 -.00 -.00 -.01 -.03 -.05 -.06 -.05 .00 .13 .34 .66

.01 -.12 -.19 -.21 -.19 -.15 -.10 -.06 -.02 -.00 .00 -.01 -.02 -.04 -.05 -.04 .01 .13 .34 .67

.03 -.11 -.18 -.20 -.18 -.14 -.10 -.05 -.02 .00 .01 .00 -.01 -.03 -.05 -.03 .02 .14 .35 .68

.04 -.10 -.17 -.19 -.17 -.13 -.09 -.04 -.01 .01 .02 .01 -.01 -.03 -.03 -.02 .03 .15 .36 .69

.06 -.08 -.15 -.16 -.15 -.12 -.07 -.03 .00 .02 .03 .02 .01 -.01 -.02 -.01 .04 .16 .37 .70

SQUARED-COSINE WEIGHTED APERTURE

FILTER WEIGHTS (AMPLITUDE RATIO)

.21	.22	.25	.28	.31	.35	.39	.42	.44	.46	.46	.44	.42	.39	.35	.31	.28	.25	.22	.21
.22	.23	.26	.29	.33	.37	.41	.45	.47	.48	.48	.47	.45	.41	.37	.33	.29	.26	.23	.22
.25	.26	.29	.32	.37	.41	.46	.49	.52	.53	.53	.52	.49	.46	.41	.37	.32	.29	.26	.25
.28	.29	.32	.36	.41	.46	.51	.56	.59	.60	.60	.59	.56	.51	.46	.41	.36	.32	.29	.28
.31	.33	.37	.41	.47	.53	.58	.63	.66	.68	.68	.66	.63	.58	.53	.47	.41	.37	.33	.31
.35	.37	.41	.46	.53	.59	.66	.71	.75	.77	.77	.75	.71	.66	.59	.53	.46	.41	.37	.35
.39	.41	.46	.51	.58	.66	.72	.78	.83	.85	.85	.83	.78	.72	.66	.58	.51	.46	.41	.39
.42	.45	.49	.56	.63	.71	.78	.85	.89	.92	.92	.89	.85	.78	.71	.63	.56	.49	.45	.42
.44	.47	.52	.59	.66	.75	.83	.89	.94	.97	.97	.94	.89	.83	.75	.66	.59	.52	.47	.44
.46	.48	.53	.60	.68	.77	.85	.92	.97	.99	.99	.97	.92	.85	.77	.68	.60	.53	.48	.46
.46	.48	.53	.60	.68	.77	.85	.92	.97	.99	.99	.97	.92	.85	.77	.68	.60	.53	.48	.46
.44	.47	.52	.59	.66	.75	.83	.89	.94	.97	.97	.94	.89	.83	.75	.66	.59	.52	.47	.44
.42	.45	.49	.56	.63	.71	.78	.85	.89	.92	.92	.89	.85	.78	.71	.63	.56	.49	.45	.42
.39	.41	.46	.51	.58	.66	.72	.78	.83	.85	.85	.83	.78	.72	.66	.58	.51	.46	.41	.39
.35	.37	.41	.46	.53	.59	.66	.71	.75	.77	.77	.75	.71	.66	.59	.53	.46	.41	.37	.35
.31	.33	.37	.41	.47	.53	.58	.63	.66	.68	.68	.66	.63	.58	.53	.47	.41	.37	.33	.31
.28	.29	.32	.36	.41	.46	.51	.56	.59	.60	.60	.59	.56	.51	.46	.41	.36	.32	.29	.28
.25	.26	.29	.32	.37	.41	.46	.49	.52	.53	.53	.52	.49	.46	.41	.37	.32	.29	.26	.25
.22	.23	.26	.29	.33	.37	.41	.45	.47	.48	.48	.47	.45	.41	.37	.33	.29	.26	.23	.22
.21	.22	.25	.28	.31	.35	.39	.42	.44	.46	.46	.44	.42	.39	.35	.31	.28	.25	.22	.21

IRRADIANCE ON THE FOCAL PLANE. 1000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.947-MICRONS

VERTICAL SCALE 1-INCH= 10.551-MICRONS

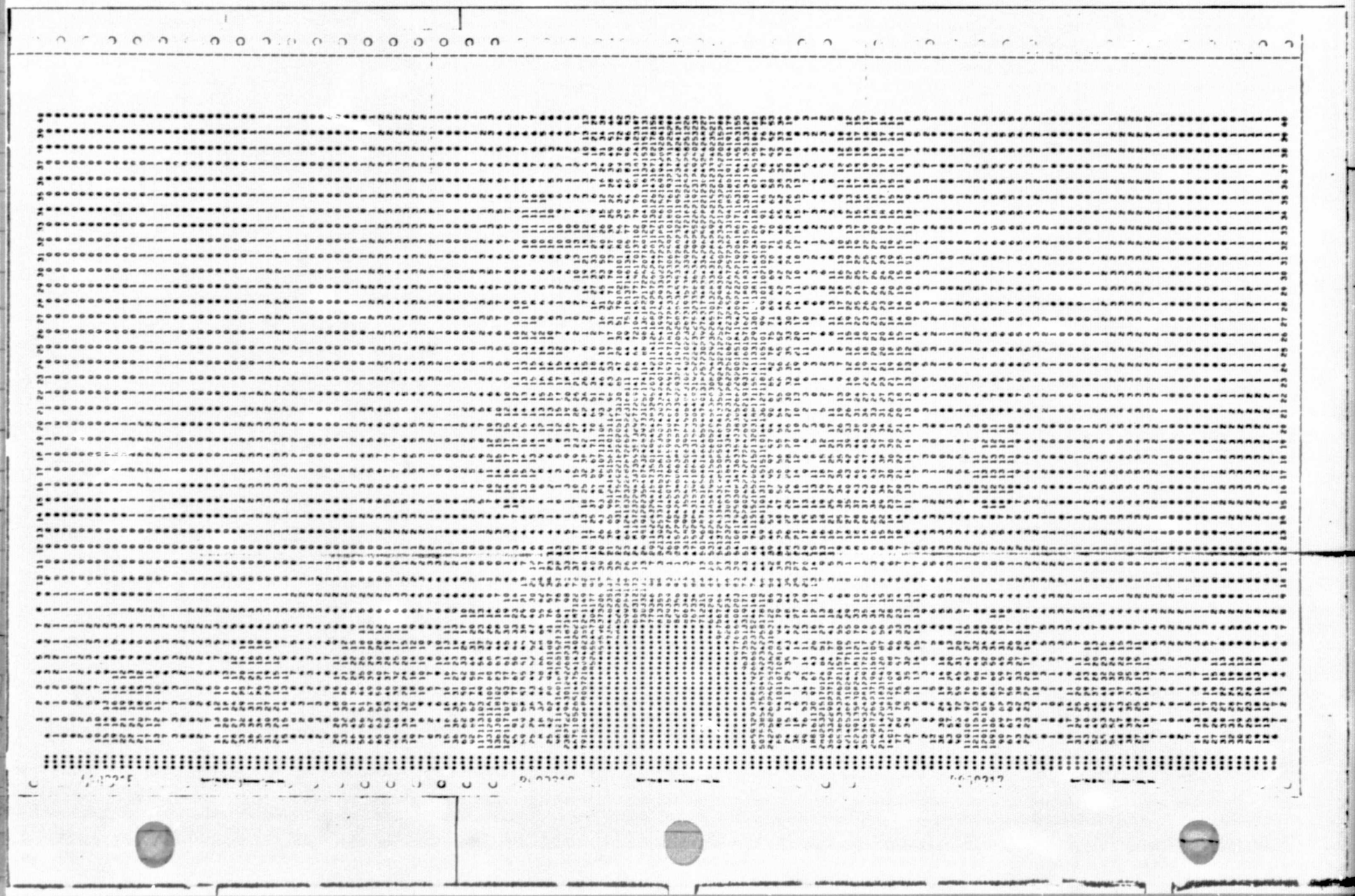
FREE APERTURE

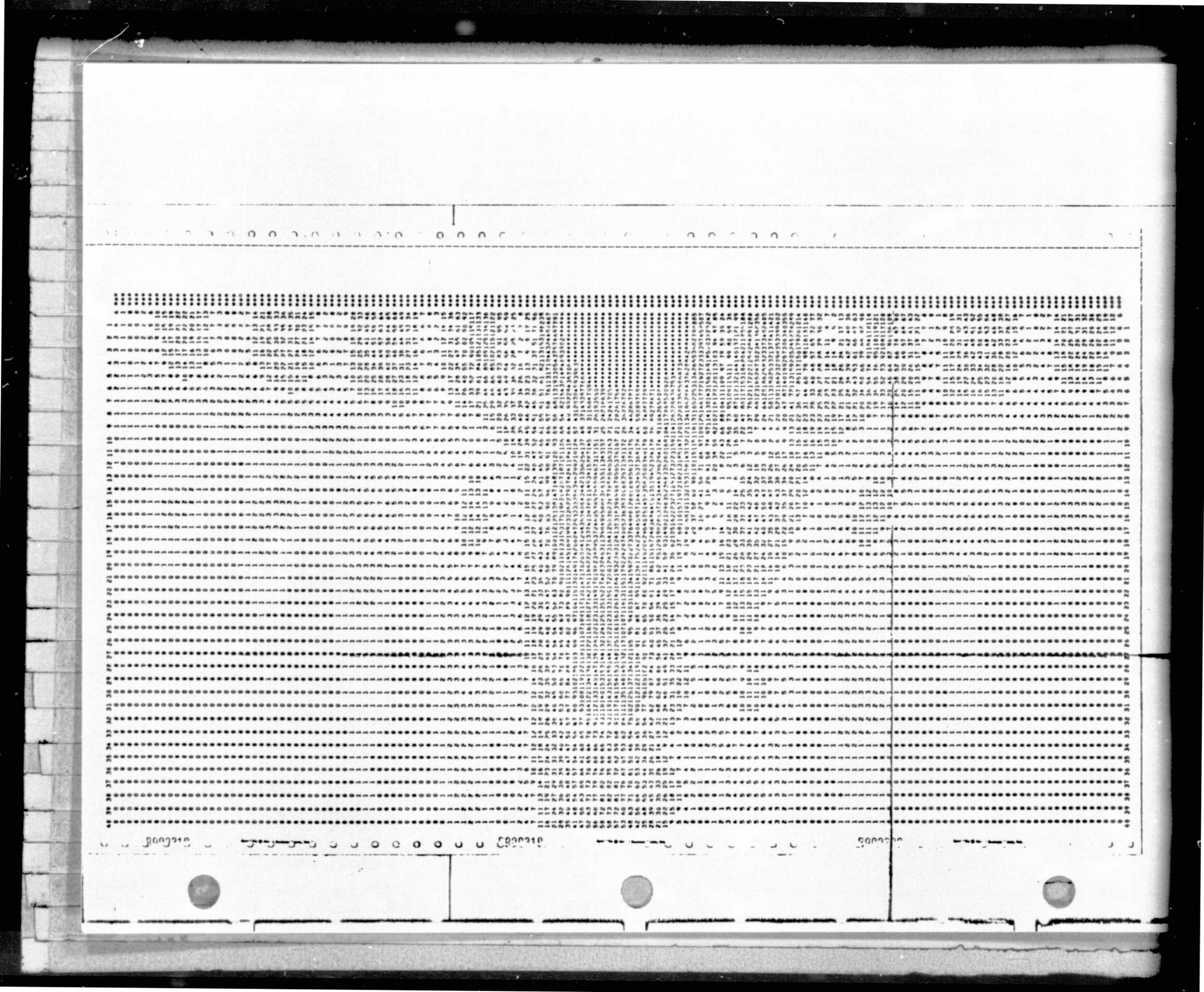
IRRADIANCE ON THE FOCAL PLANE, 10000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.947-MICRONS

VERTICAL SCALE 1-INCH= 10.551-MICRONS

FREE APERTURE



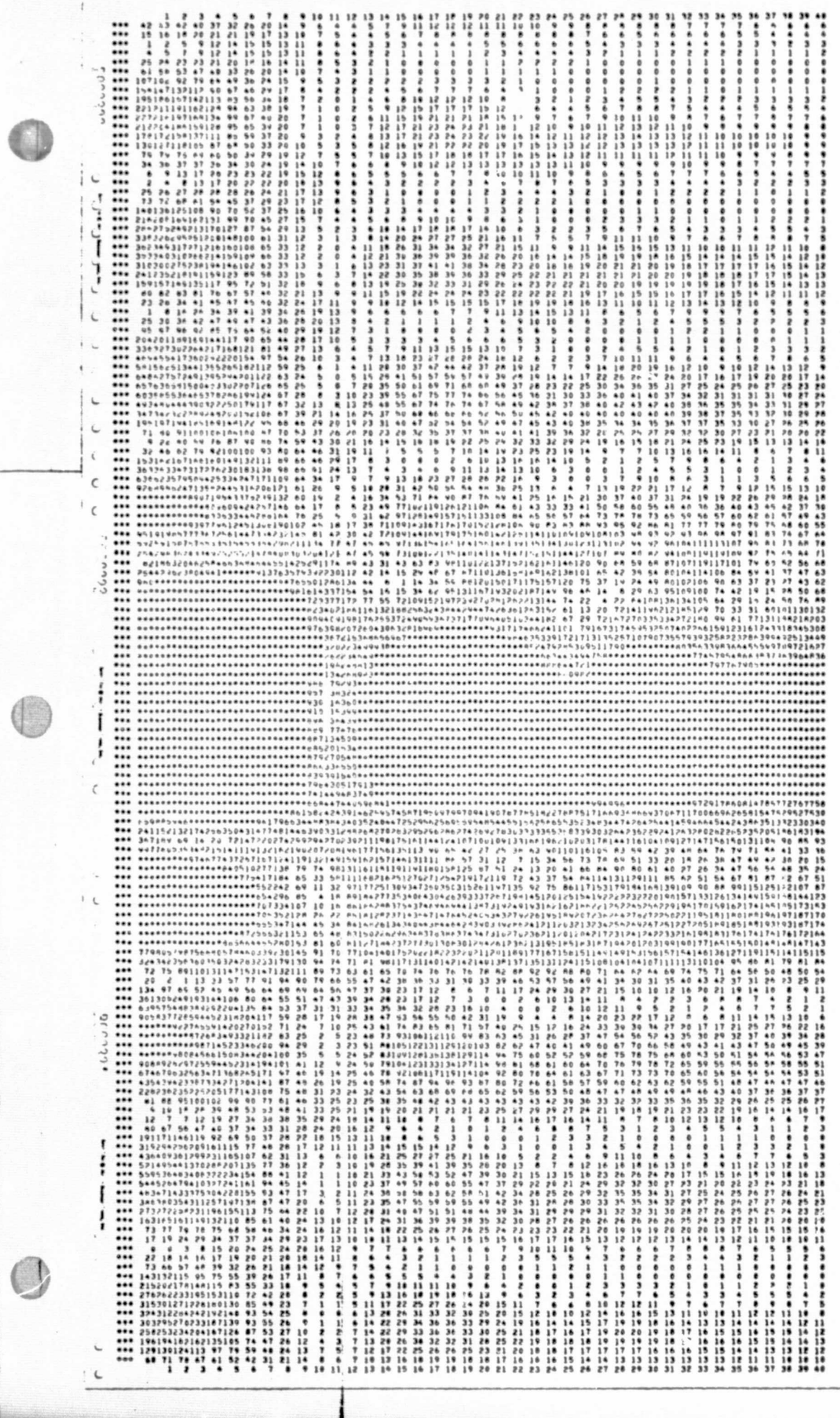


IRRADIANCE ON THE FOCAL PLANE,100000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.947-MICRONS

VERTICAL SCALE 1-INCH= 10.551-MICRONS

FREE APERTURE

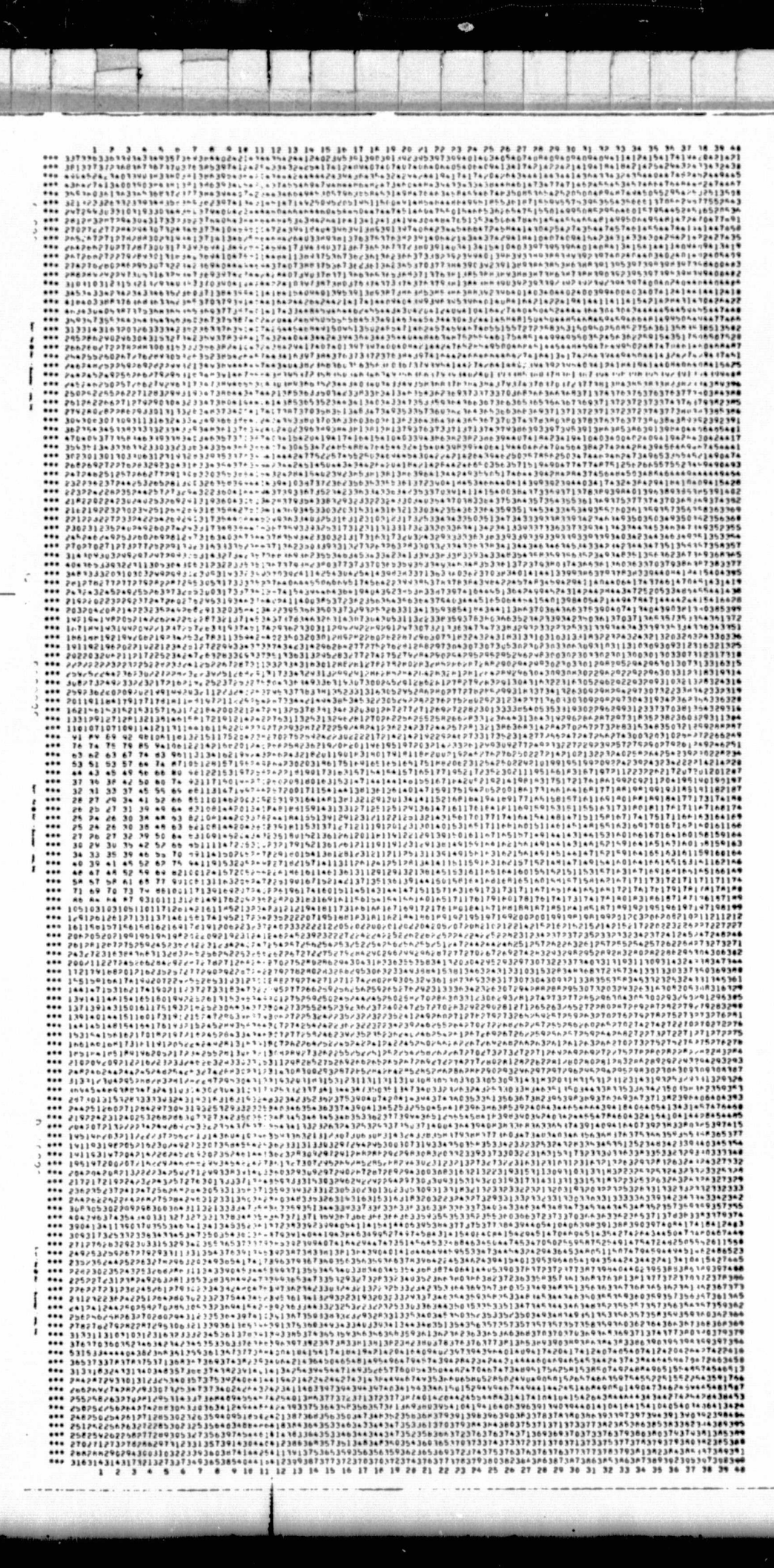


IRRADIANCE ON THE FOCAL PLANE, 0=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.947-MICRONS

VERTICAL SCALE 1-INCH= 10.551-MICRONS

FREE APERTURE



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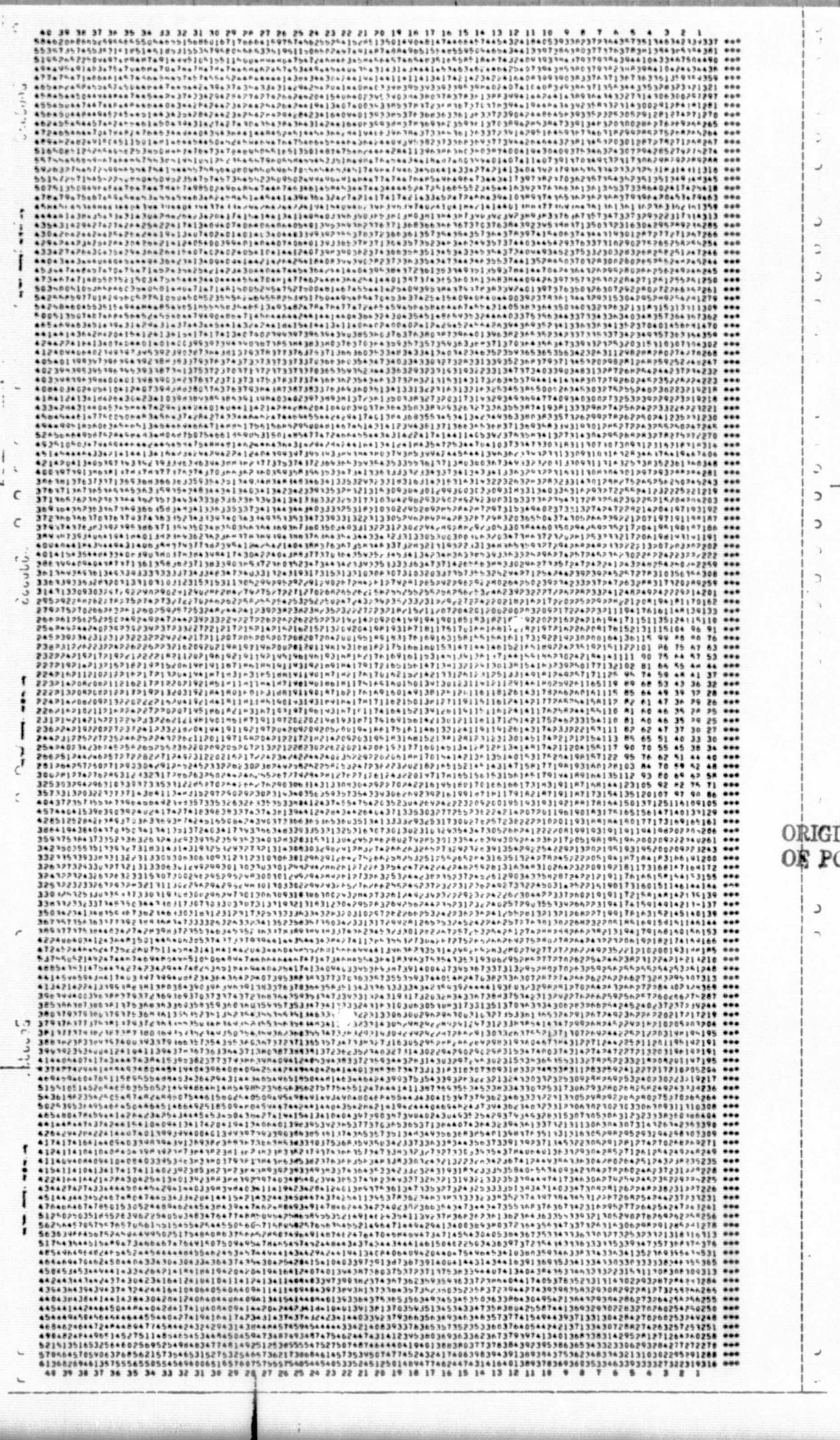

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OF POOR QUALITY

Field point #2, r -r =-1.0

Cos^2 weighted aperture

IRRADIANCE ON THE FOCAL PLANE, 1000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.947-MICRONS

VERTICAL SCALE 1-INCH= 10.551-MICRONS

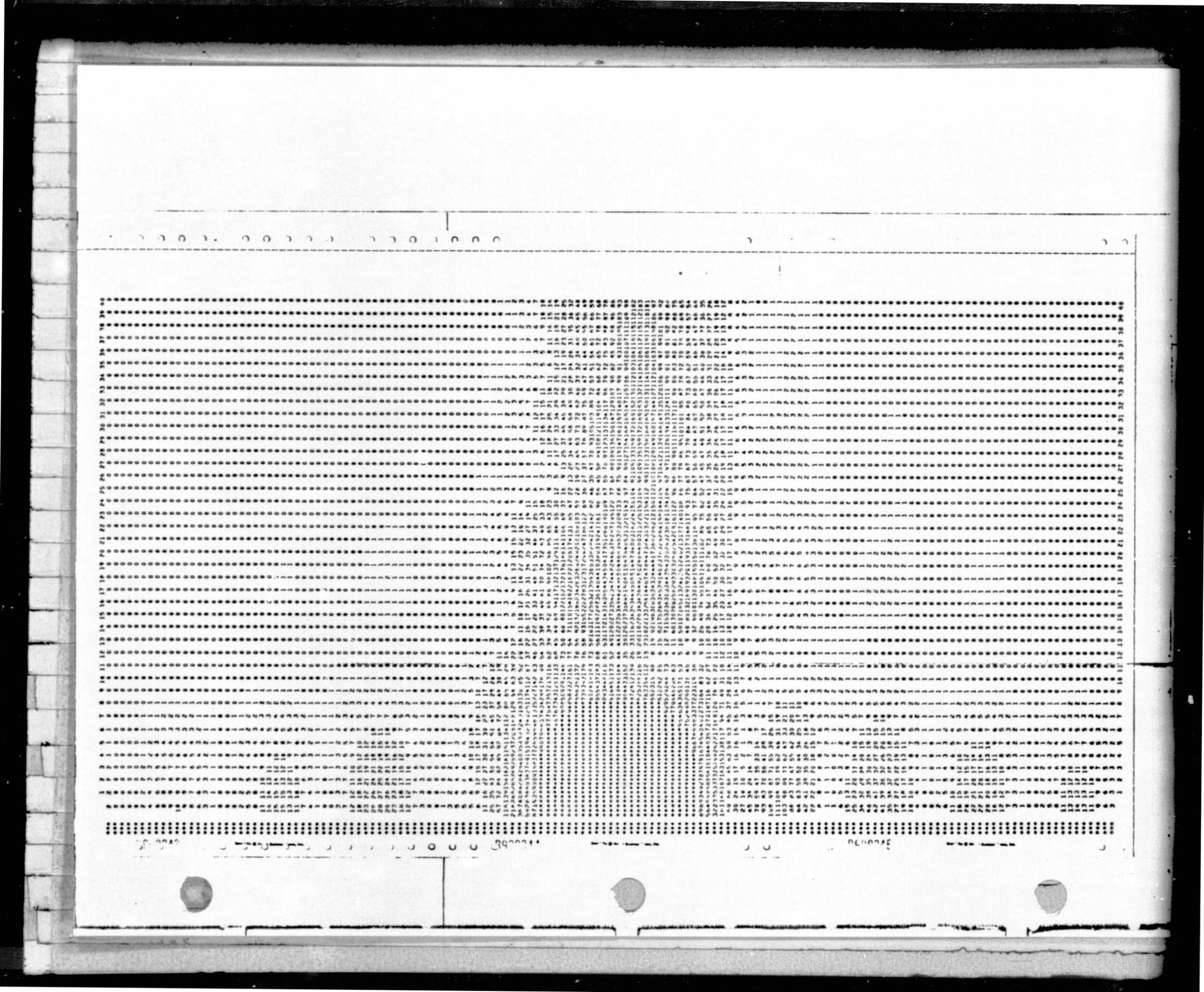
.207FILTER TRANSMITTANCE AT EDGE OF APERTURE

IRRADIANCE ON THE FOCAL PLANE, 10000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.947-MICRONS

VERTICAL SCALE 1-INCH= 10.551-MICRONS

.207FILTER TRANSMITTANCE AT EDGE OF APERTURE

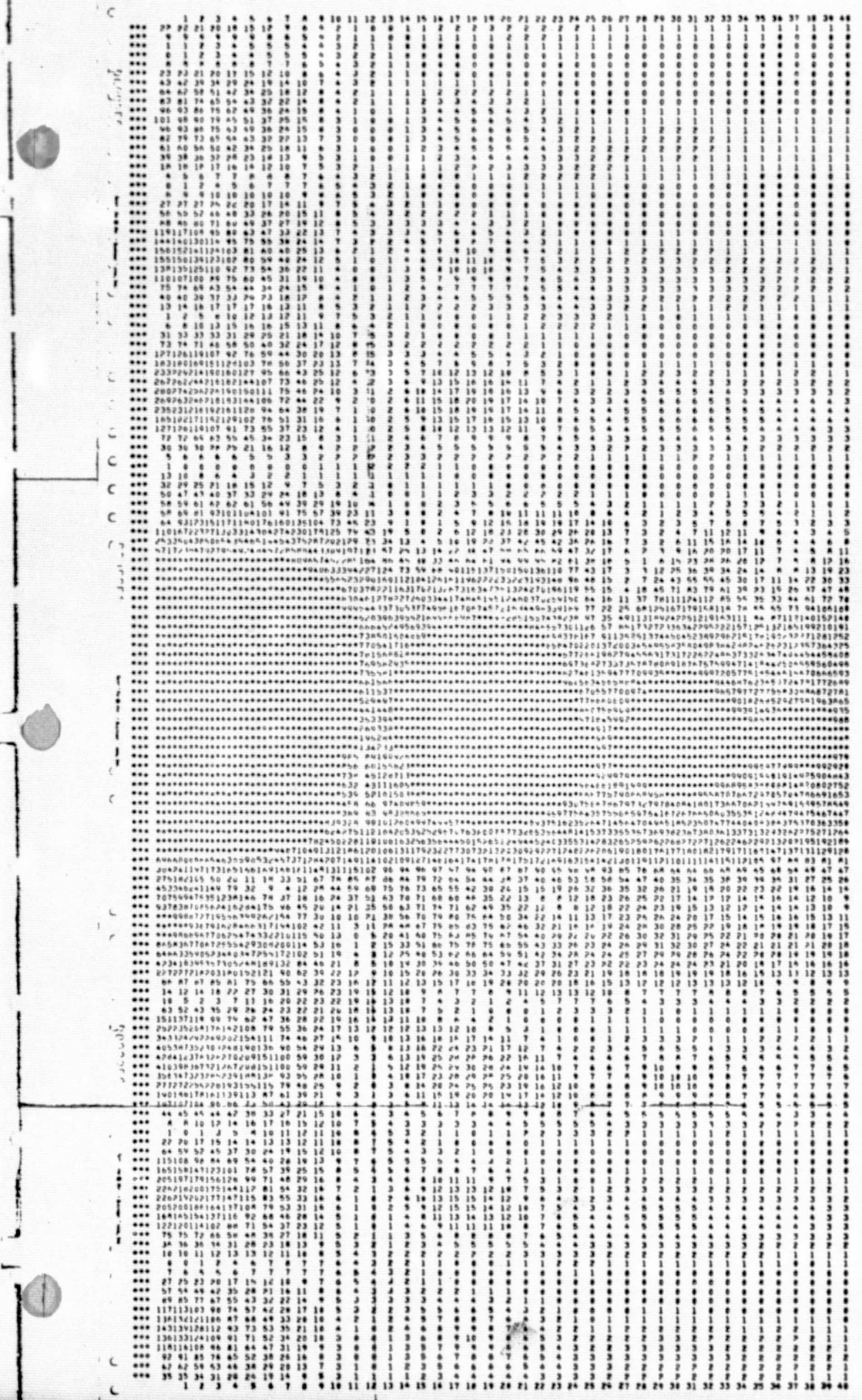


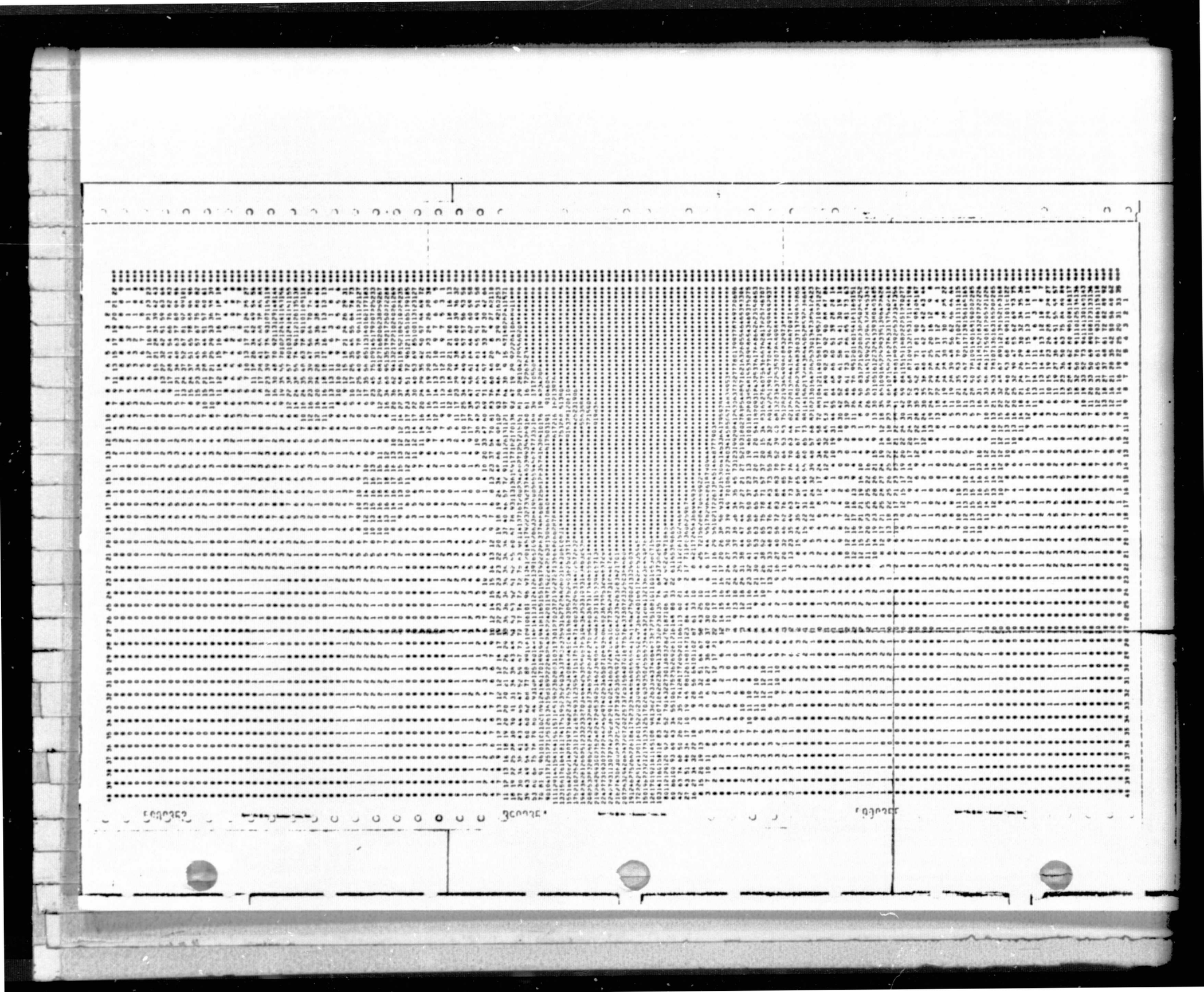
IRRADIANCE ON THE FOCAL PLANE, 100000=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.947-MICRONS

VERTICAL SCALE 1-INCH= 10.551-MICRONS

.207FILTER TRANSMITTANCE AT EDGE OF APERTURE





IRRADIANCE ON THE FOCAL PLANE, 0=PEAK INTENSITY ON THE ABERRATION-FREE IMAGE

HORIZONTAL SCALE 1-INCH= -2.947-MICRONS

VERTICAL SCALE 1-INCH= 10.551-MICRONS

.207FILTER TRANSMITTANCE AT EDGE OF APERTURE